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Einleitung.

1.

Dem dritten und letzten Bande des Sternverzeichnisses, welches aus der Bonner Durchmusterung des nördlichen Himmels entstanden ist, und welches ich hiermit den Astronomen übergebe, habe ich nur Weniges vorauszuschicken. Es umfasst die Sterne, welche auf der 3ten, 4ten und 5ten Section der Bonner Himmelscharten verzeichnet sind, das heisst, das Kugelsegment zwischen 41° nördlicher Declination und dem Nordpole und enthält auf diesem Raume 108129 Sterne oder 15¼ auf den Quadratgrad. Im Wesentlichen sind die Beobachtungen, auf welchen die Positionen des gegenwärtigen Verzeichnisses beruhen, auf dieselbe Weise angestellt, wie die frühern. Es sind jedoch zwei Ausnahmen zu erwähnen. Als mit dem Schlusse des November 1856 die beiden ersten Sectionen mit geringen Ausnahmen fast vollständig und auch die sternreicheren Gegenden der 3ten Section grösstentheils absolvirt waren, erschien es angemessen, für die sternärmern, dem Pole nähern Gegenden die Zonen breiter zu machen. Es geschah dies nicht nur, um Zeit zu gewinnen, und dadurch die Arbeit rascher dem ersehnten Ende zuzuführen, sondern auch in der Absicht, eine gar zu grosse Anhäufung der schwächern Sterne, und dadurch herbeigeführte Ungleichförmigkeit in den einzelnen Theilen derselben zu vermeiden. Denn bei der grossen Schwierigkeit, die relative Helligkeit der schwächsten Sterne richtig zu schätzen, wurden nothwendig um so mehrere auch von diesen mit beobachtet, je geringer die Zahl der Sterne überhaupt und je mehr Zeit desshalb vorhanden war. Es wurde daher statt des früher beschriebenen *) Micrometers in dem Cometensucher ein anderes angebracht, dessen Einrichtung in allem Uebrigen der des frühern ganz gleich war, nur dass die einzelnen Declinationsstriche 10′ von einander abstanden, und daher 20 Striche nicht wie früher 2° 20′, sondern 3° 20′, umfassten, so dass Zonen in einer Breite von 3° beobachtet werden konnten. Dieses Micrometer ist von der 1123ten 1856 Dec. 2 beobachteten Zone an benutzt worden, auch bei den wenigen spätern Zonen, die in sternreichern Gegenden nur über 2° Breite ausgedehnt wurden. Ein irgend bedeutender Verlust in der Genauigkeit der Declinationen ist daraus nicht entstanden, wie sich voraussehn liess, da eine Minute, die in diesem Micrometer noch geschätzt werden konnte, bei nur 10maliger Vergrösserung schon eine so kleine Quantität ist, dass die Genauigkeit ihrer Bestimmung fast nur von der Schärfe des Sehens, nicht von der Grösse des Intervalls zwischen den Declinationsstrichen abhängt. Eine wesentlichere Aenderung in der Beobachtungsmethode ist aber von 81° an befolgt worden. Die Anwendung der frühern hätte für diese 9 Zonen bei 3° Breite wenigstens ein halbes Jahr Zeit erf-

*) Bd. 3. p. VI.

dert, und wäre bei der Seltenheit der Sterne so langweilig und ermüdend gewesen, dass dadurch leicht die Güte der Beobachtungen hätte leiden können; die Zonen aber breiter zu machen, verhinderte die geringere Deutlichkeit der Bilder in grössern Abständen vom Mittelpuncte. Es hätte aber auch gar keinen Zweck gehabt, in dieser Gegend rohe Positionen zu bestimmen, wo wir in Carringtons vortrefflichem Cataloge die genauesten Bestimmungen fast aller der Sterne besitzen, die hier in Frage kommen. Dagegen war es nöthig, die Grössen der Carrington'schen Sterne nachzusehn und unsern Principien gemäss festzustellen, um sie mit den übrigen in Uebereinstimmung zu bringen. Dies geschah auf die Weise, dass sämmtliche Sterne dieses Segmentes nach Carringtons ältern und provisorischen Charten *) mit dem Himmel verglichen und in Beziehung auf die Grössen neu bestimmt wurden. Dazu wurde aber ein grösserer Cometensucher von 43 Linien Oeffnung und 12maliger Vergrösserung benutzt, weil bei dem steten Uebergange von dem dunkeln Himmel zur erleuchteten Charte das Auge des Beobachters einen bedeutenden Theil seiner Empfänglichkeit für schwache Lichteindrücke verlieren musste, und der gewöhnliche Cometensucher daher bei dieser Beobachtungsart eine Menge der schwächern Sterne nicht würde haben erkennen lassen. Freilich sind aber nun in dieser Himmelsgegend auch alle Sterne bis zu der vorgesetzten Gränze in unser Verzeichniss gekommen, und ist dieselbe daher bedeutend reicher ausgefallen, als die auf die gewöhnliche Weise durchmusterten, in denen, selbst wenn sie sehr sternarm sind, doch immer noch viele der schwächern Sterne fehlen. Wir haben mit kaum einer oder der andern Ausnahme alle Sterne des Carrington'schen Verzeichnisses, und noch etwa 300, die in diesem nicht vorkommen. Die letztern sind in dem Verzeichnisse durch den Buchstaben *n* unterschieden, und ihre Positionen nach unsern Beobachtungen am Heliometer als Aequatoreal angesetzt, während alle übrigen Positionen mit Ausnahme der wenigen am Bonner Meridiankreise bestimmten und mit *B* bezeichneten nach Carringtons Cataloge angesetzt sind. Und zwar sind alle Sterne, die nur bei Carrington vorkommen, ohne Buchstabenbezeichnung in der letzten Columne, diejenigen hingegen, die sich auch in andern Catalogen finden, führen den Buchstaben eines von diesen, wobei s den Schwerd'schen, F den Fedorenko'schen Catalog bedeuten.

2.

Es dürfte nicht uninteressant sein, einige statistische Notizen über die ganze Arbeit hier zusammen zu stellen. Meine Mitarbeiter dabei waren vom Anfange bis zum 5. Mai 1853 Herr Fr. Thormann, seit dem 28. Februar 1853 Herr Professor E. Schönfeld und seit dem 28. August desselben Jahres Herr Professor A. Krüger. Ausserdem hat Herr Professor J. Schmidt nicht unbedeutenden Antheil daran, indem aus der Reihe von Beobachtungen, die derselbe behufs der von ihm bearbeiteten Hora V. der Berliner Akademischen Sterncharten hier angestellt hat, diejenigen, welche in den Bereich auch unsrer Charten fallen, mit benutzt, und daher die betreffenden Gegenden nur noch einmal durchmustert worden sind. Es konnte dies ohne Beeinträchtigung der Gleichförmigkeit geschehn, da jene Beobachtungen nach derselben Methode angestellt worden waren, wie die unsrigen. Das Hauptverdienst an dem Gelingen der Arbeit aber haben die Herren Schönfeld und Krüger, und ein so wesentliches, dass ich dieselbe nur als eine von ihnen und mir gemeinschaftlich ausgeführte ansehn kann, und mich gedrungen fühle, denselben in meinem und im Namen der Wissenschaft den wärmsten Dank auszusprechen für die Umsicht, den Eifer und die Ausdauer, mit der sie diesem Werke ihre schönen Talente gewidmet haben.

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* Nine draft maps (printed by the anastatic process) Redhill Observatory 1853 Dec. qu. folio.

Ausserdem kann ich nicht umhin, meinen aufrichtigen Dank auszusprechen den Herren, welche das Geschäft des Aufschreibens der Beobachtungszeiten und der Grössen übernommen hatten. Es waren dies der Zeitfolge nach die Herren Ant. Danz, Ad. Vogt, Jac. Schwalen, Dr. Th. Meyer, Aug. Hütten, Dr. Georg Steeg, Gust. Lehmann, Aug. Karstein und Ed. Desclabissack, von denen namentlich die Herren Meyer und Lehmann uns mehrere Jahre lang unterstützt, und auch einen grossen Theil der Berechnungen ausgeführt haben. Ausserdem haben nicht selten, wenn einer oder der andre dieser Herren verhindert war, oder der Himmel sich spät in der Nacht unerwartet aufklärte, die Beobachter selbst einer dem andern aufgeschrieben, so wie wir uns auch desselben Dienstes von mehreren jüngern Astronomen, die uns auf ihren Reisen besuchten, zu erfreuen hatten. Das Verdienst dieser sämmtlichen Herren ist nicht gering anzuschlagen, da ihr Geschäft besonders bei der grossen Schnelligkeit, mit der die Beobachtungen sich häufig folgten, eine anhaltende grosse Sorgfalt und angestrengte Aufmerksamkeit erforderte und die treue Ausführung desselben wesentlich zum Gelingen des Ganzen beigetragen hat.

Nach mehreren vorbereitenden und zur Uebung bestimmten Beobachtungen wurde die erste für das Verzeichniss wirklich benutzte Cometensucherzone am 25. Februar 1852, die letzte am 27. März 1859 beobachtet, und die Beobachtungen dieser Art, das eigentliche Fundament der ganzen Arbeit haben also 7 Jahre und 1 Monat gedauert, während welcher Zeit in 625 Nächten 1841 Zonen beobachtet worden sind, und zwar fielen deren auf die Jahre

1852	82	Zonen	in	50	Nächten
1853	219	„	„	83	„
1854	285	„	„	91	„
1855	199	„	„	75	„
1856	347	„	„	99	„
1857	335	„	„	106	„
1858	311	„	„	99	„
1859	63	„	„	22	„

Von diesen habe ich 12 beobachtet, Thormann 110, Schönfeld 909 und Krüger 810. Durchschnittlich sind in jeder Nacht 3 Zonen beobachtet worden, wenn aber die ganze Nacht klar und ohne Mondschein war, namentlich seitdem durch Schönfelds Eintritt immer 2 Beobachter sich abwechseln konnten, bedeutend mehr, gewöhnlich 5 bis 6, nicht selten 7 bis 8 und zweimal sogar 9, zu welchen letztern das eine Mal 12, das andre Mal 10½ Stunden gebraucht wurden. Am günstigsten sind die Beobachtungen des October gewesen: in den 7 Octobermonaten sind in 71 Nächten 257 Zonen beobachtet, durchschnittlich 3.6 in jeder Nacht, und unter diesen nimmt wieder der October 1856 den ersten Platz ein, indem er in 15 Nächten 72 Zonen geliefert hat. Es ist dies überhaupt der Monat gewesen, welcher die meisten Zonen zu beobachten gestattet hat; ihm zunächst kommt der März 1856 mit 61 Zonen in 13 Nächten. Ausserdem ist noch im Juni 1857 in 14 Nächten beobachtet worden; aber wegen der Kürze derselben hat dieser Monat doch nur 29 Zonen eingebracht, immerhin die grösste Zahl, die überhaupt in einem Junimonate erhalten worden ist. Von den erwähnten 1841 Zonen sind aber 44 südlicher als —2° beobachtet worden, und daher dem gegenwärtigen Verzeichniss nicht zu Gute gekommen, so dass dieses also nur auf 1797 Cometensucherzonen beruht. In diesen kommen nach einem ungefähren Ueberschlage 850000 einzelne Beobachtungen vor, so dass im Mittel auf jede Zone deren 473 fallen, oder da man durchschnittlich auf jede Zone auch eine Stunde wird rechnen können, ungefähr 8 auf die Minute. Indess ist diese Zahl in der Milchstrasse immer sehr bedeutend überschritten worden; die in die reicheren Gegenden derselben fallenden Zonen haben

meistens 900 bis 1000 Beobachtungen geliefert, und oft im Halse des Schwans, so wie ein paar Mal im Orion selbst die letztere Zahl nicht unbedeutend überschritten. So hat die Zone 285 bei +1° mittlerer Declination zwischen 6ᵘ 5'.3 und 6ᵘ 52'.8 897 Sterne oder 1133 in der Stunde, Zone 979 bei +29° Declination zwischen 19ᵘ 18'.4 und 20ᵘ 24'.1 1187 Sterne oder 1084 in der Stunde, die Zone 990 bei +31° Declination zwischen 19ᵘ 13'.9 und 20ᵘ 23'.9 1288 Sterne oder 1104 in einer Stunde, Zone 998 in +38° zwischen 19ᵘ 22'.5 und 20ᵘ 17'.4 995 oder 1087 in einer Stunde und Zone 984 von Krüger 1856 Aug. 1 bei sehr durchsichtiger Luft in +36° beobachtet, zwischen 19ᵘ 26'.5 und 20ᵘ 28'.9 gar 1275 Sterne oder 1226 in der Stunde, fast 20½ in der Minute. In den ersten 11½ Minuten derselben ist die Mittelzahl sogar 23.6 für die Minute, und in einzelnen Minuten kommen bis 27 Sterne vor. Dies ist freilich noch nicht das Maximum, da in einzelnen Minuten andrer Zonen bis 29 und 30 Sterne beobachtet sind, aber keine andre vollständige Zone ist so reich, wie die erwähnte. Sie muss unter in jeder Hinsicht andauernd sehr günstigen Umständen beobachtet sein, und kann als ein Beispiel dienen, was unter solchen ein guter Beobachter bei unsrer Methode zu leisten vermag.

Die Revisionszonen wurden nur bei Mondschein oder in seltenen Fällen in der Dämmerung beobachtet, auch dann noch, als nach dem Schlusse der Cometensucherzonen die dunkeln Nächte nicht mehr für diese gebraucht wurden. Es geschah dies, um die feinern Theilstriche, die bei der etwa 30maligen Vergrösserung ziemlich schwach erschienen, deutlich sehn zu können, hauptsächlich aber auch, um nicht durch zu viele schwache Sterne verwirrt zu werden, und um die Grössen sicherer schätzen zu können. Das dazu benutzte Fernrohr war Anfangs ein 4½füssiger Fraunhofer, bei dessen Micrometer der Abstand der Declinationsstriche 2'.78 war. Das Feld desselben umfasste aber kaum einen Grad, und da ausserdem bei der Art seiner Aufstellung die Lage des Beobachters häufig eine sehr unbequeme und ermüdende war, so dass dadurch die Güte der Beobachtungen wesentlich beeinträchtigt wurde, vertauschten wir es im September 1855 mit einem 5füssigen Fernrohre aus derselben Anstalt, dessen Feld bei dem gebrauchten Ocular 1° 7' gross ist, und das in allen Stellungen dem Beobachter eine bequemere Lage gestattet, namentlich seitdem das frühere Pyramidalstatif mit einer parallactischen Aufstellung vertauscht worden war; der Zwischenraum zwischen den Declinationsstrichen war bei demselben nahe 2½ Minute. Die 44te Revisionszone ist die erste, die mit demselben beobachtet worden ist.

Es sind zwischen 1854 Jan. 19 und 1861 April 19, einige ganz kurze Bruchstücke ungerechnet, überhaupt 476 Revisionszonen beobachtet worden, 172 davon von Schönfeld, 304 von Krüger, und dazu 227 Nächte ganz oder zum Theil verwandt worden, durchschnittlich also etwa 66 in jedem Jahre; die wirkliche Vertheilung auf die einzelnen Jahre ist aber eine sehr ungleiche, so wie es eben der Fortgang der ganzen Arbeit bedingte, und die Zeit, die die übrigen Theile derselben erforderten, gestattete. Es sind beobachtet worden in den Jahren

1854	31	Zonen	in	22	Nächten
1855	28	„	„	15	„
1856	61	„	„	36	„
1857	46	„	„	24	„
1858	126	„	„	47	„
1859	127	„	„	50	„
1860	53	„	„	30	„
1861	4	„	„	3	„

Auch diesen Beobachtungen ist wieder der Octobermonat der günstigste gewesen, indem er in 33 Nächten 72 Zonen geliefert hat, also durchschnittlich in fast 5 Nächten über 10 Zonen.

In den 476 Zonen sind ungefähr 137000 Beobachtungen gemacht worden, oder im Mittel in jeder Zone 287. Diese Zahl gegen die für die Cometensucherzonen gefundene Mittelzahl gehalten, kann gering erscheinen, wenn man berücksichtigt, dass die Revisionszonen meistens nur in sehr sternreichen Gegenden beobachtet wurden. Um aber das richtige Verhältniss zu erhalten, muss man die nähern Umstände berücksichtigen: Die Revisionszonen sind durchschnittlich der Zeit nach viel kürzer, als die Cometensucherzonen, nur der kleinere Theil ist eine Stunde lang beobachtet worden, viele nicht über 20 bis 30 Minuten lang; ferner sind nicht wenige Revisionszonen auch in den nördlicheren Gegenden nöthig gewesen, wo die Cometensucherzonen 3° breit beobachtet wurden, und endlich muss man nicht vergessen, dass in den Cometensucherzonen selbst in den reichsten Gegenden immer noch viele sehr schwache Sterne vorkommen, weil die Zeit fehlte, eine sorgfältige Auswahl zu treffen, und eine solche bei Sternen, die nahe der Gränze der Sichtbarkeit stehn, auch an und für sich sehr schwierig ist, da der Eindruck, den sie bei flüchtigem Zusehn aufs Auge machen, von einer Menge von Umständen abhängt, die unabhängig vom Beobachter sind. Daher kommen fast in jeder Zone Sterne vor, die in den Cometensucherzonen oft selbst doppelt beobachtet sind, und also unzweifelhaft existiren, in der Revisionszone aber dennoch fehlen, weil hier die grössere Leichtigkeit war, sie als zu schwach für unsern eigentlichen Zweck zu erkennen. In den reichern Gegenden ist das Verhältniss nahe das richtige von 1 zu 2. In der Milchstrasse sind durchschnittlich um 400 Sterne in der Stunde beobachtet, in den reichern Gegenden derselben um 500, und die reichsten, besonders im Halse des Schwans, übersteigen diese Zahl sehr bedeutend. So haben die Revisionszonen 146, 150, 40, 251, 27, die in die genannten Gegenden fallen, resp. 573, 578, 579, 580 und 594 Sterne in der Stunde. Die reichste ist die Zone 2, obgleich 1854 März 13 nur einen Tag vor dem Vollmonde beobachtet: sie enthält bei der mittlern Declination +0°.7 zwischen 6ᵘ 2'.3 und 7ᵘ 12'.0 nicht weniger als 831 Sterne, oder 715 in der Stunde. Dies erklärt sich daraus, dass bei der noch geringen Bekanntschaft des Beobachters mit der Kraft des Fernrohrs diese unterschätzt, oder vielmehr der Einfluss der Erleuchtung durch den Mond überschätzt worden war, so dass diese Zone eine grosse Menge von Sternen enthält, die in den Cometensucherzonen derselben Gegend auch nicht einmal vorkommen, und von 9 Sternen derselben, die in den Bereich der Bond'schen Zonen fallen, dessen Verzeichniss nur einen hat, obgleich es sonst eine grosse Menge viel schwächerer enthält, als wir sie beobachtet haben. Später ist dieser Uebelstand bei grösserer Uebung vermieden worden. Uebrigens sind die durch die Revisionszonen erhaltenen Positionen nicht allein viel genauer, als die der Cometensucherzonen, wie es in der Natur der Sache liegt, und auch in der Einleitung zum 3. Bande schon gezeigt worden ist, sondern es sind auch darin weit weniger Versehen vorgefallen, namentlich kommen doppelte Beobachtungen desselben Sterns fast gar nicht vor. Ich glaube daher, dass wenn wieder einmal eine ähnliche Arbeit nach derselben Methode angestellt werden sollte, es vortheilhaft wäre, sich hierzu eines 4- bis 5füssigen Fernrohrs zu bedienen. Der Zeitverlust, der dabei durch die geringere Breite der Zonen entstehn würde, würde zum grössten Theile aufgewogen werden durch die unvergleichlich viel geringere Zahl von Versehn, deren Berichtigung eine sehr bedeutende Zeit in Anspruch genommen hat, ferner durch den Umstand, dass man fast alle klaren Nächte, nicht bloss die mondscheinfreien, dazu benutzen könnte, ganz abgesehn von der viel grössern Sicherheit in den Positionen, die man auf diese Weise erhielte, und die so gross ist, dass wenn man auf diese Art bestimmte Sterne als Vergleichsterne für kleine Planeten oder Cometen benutzte, ihre Positionen immer schon einen ziemlich genäherten Ort geben würden. Man müsste dann das Feld des Fernrohrs künstlich erleuchten, und diese Erleuchtung so einrichten, dass man eben die schwächsten Sterne, die man beobachten wollte, noch deutlich sähe. Es würde selbst bei einiger Uebung gelingen, die Beleuchtung nach der jedesmaligen grösseren oder geringern Durchsichtigkeit der Luft zu modificiren.

Um nun eine angenäherte Schätzung über die ganze Zahl der Beobachtungen zu erhalten, die für unsre Arbeit angestellt sind, können wir annehmen, dass von den Schmidt'schen 26000 Beobachtungen etwa 14000 derselben zu Gute gekommen sind. Veranschlagen wir ferner die Zahl derjenigen, die zur Lösung der mannigfachen Zweifel am Meridiankreise und am Heliometer als Aequatoreal angestellt worden sind, wohl nicht zu gering zu 60000, so ergiebt sich eine Gesammtsumme von 1061000, sicher bedeutend über eine Million Beobachtungen. Die Zahl der einzelnen Ziffern aber, die bei Gelegenheit der Anfertigung desselben geschrieben worden sind, dürfte sich auf 35 bis 36 Millionen belaufen.

Ausser dem Hauptzwecke der Durchmusterung wurden noch mehrere Nebenzwecke verfolgt, die sich ohne bedeutend grössere Arbeit und ohne erheblichen Zeitverlust erreichen liessen. Die Hoffnung, dass sie zur Entdeckung neuer Planeten führen würde, ist freilich nicht erfüllt worden, sie war auch von Anfang an nur eine schwache, und ich habe sie ganz aufgegeben, nachdem sich sehr bald herausgestellt hatte, dass ihre Realisirung zu einer Menge von Unbequemlichkeiten geführt und höchst störend auf den Fortgang der Arbeit eingewirkt hätte. Eine solche Entdeckung wäre kaum anders als bei mehrere Nächte anhaltender Klarheit gelungen; es wäre dann nöthig gewesen, dieselbe Gegend in zwei auf einander folgenden Nächten zu durchmustern, die Beobachtungen gleich zu reduciren und einzutragen, die nur an einem Abende vorkommenden Sterne mit denen des andern zu vergleichen, und zu untersuchen, ob dieser vielleicht solche geliefert habe, deren Differenzen mit denen des andern sich durch eine Bewegung, wie sie die kleinen Planeten haben, erklären liessen. Hätte man solche entdeckt, und es wäre dies in sternreichen wohl häufig der Fall gewesen, so hätte der Himmel von Neuem zu Rathe gezogen werden müssen, und in den meisten Fällen hätte man wohl beide schwache Sterne noch an ihrer Stelle gefunden; die Arbeit, die wir bei unserm geringen Personal dem Hauptzwecke hätten entziehn müssen, wäre eine vergebliche gewesen. Manche Planeten werden allerdings in unsern Zonen vorkommen, von mehreren haben wir es erkannt, so von Pomona, die wir am Tage nach ihrer Entdeckung 1854 Oct. 27 in unsrer Zone 556 als einen Stern 9.10^{m} beobachtet haben, ohne natürlich ihn als Planeten zu erkennen.

Dagegen hat aber die Durchmusterung Gelegenheit gegeben zur Auffindung einer ziemlichen Anzahl von veränderlichen Sternen; ich gebe sie mit ihren Positionen für 1855 nach der Reihenfolge ihrer Entdeckung hier an:

	u	′	″	°	′	
R Canis min.	7	0	44.0	+10	15.0	
R Herculis	15	59	42.7	+18	45.8	
R Aquilae	18	59	23.3	+ 8	0.8	
S Herculis	16	45	17.7	+15	11.3	
R Comae	11	56	49.0	+19	35.1	
R Arietis	2	7	52.2	+24	22.7	
T Herculis	18	3	37.1	+30	59.9	
R Bootis	14	30	47.8	+27	22.0	
R Vulpeculae	20	57	55.7	+23	14.9	
R Andromedae	0	16	24.5	+37	46.3	
S Cygni	20	2	27.6	+57	34.1	
S Bootis	14	18	1.2	+54	28.3	
T Ursae maj.	12	29	46.3	+60	17.2	
S Cassiopeae	1	9	3.6	+71	50.8	
R Aurigae	5	5	35.9	+53	25.2	

Die meisten dieser Sterne kommen schon in ältern Catalogen vor, und wurden eben dadurch als veränderlich erkannt, dass sie bei uns fehlten, oder in sehr verschiedener Grösse notirt waren. Bei andern wurden wir auf die Veränderlichkeit oft in sehr eigenthümlicher Weise aufmerksam. Noch sind mehrere Sterne in Untersuchung, bei denen sich aber bis jetzt noch nichts Sicheres herausgestellt hat.

Gross ist auch die Zahl der Sterne mit bedeutender eigner Bewegung, welche durch unsre Durchmusterung bekannt geworden sind, ich werde sie nebst ihren aus ältern und hiesigen Beobachtungen abgeleiteten Bewegungen im nächsten Bande mittheilen. Dieser Band wird auch die genauen Positionen von etwa 30000 Sternen enthalten, die bei Gelegenheit der Revisionen am hiesigen Meridiankreise bestimmt sind, deren genaue Reduction uns jetzt eifrig beschäftigt. Dieses Verzeichniss wird zugleich sämmtliche solche Sterne durch vollständige Meridianbeobachtungen bestimmt enthalten, die in unsrer Durchmusterung als 8^m oder heller notirt sind, aber in keinem frühern Cataloge sich vorfinden; ihre Zahl ist beträchtlicher als man vermuthen sollte.

Die gröberen Fehler in den Zonenbeobachtungen von Lalande, Bessel und meinen nördlichen werden hoffentlich durch unsre Durchmusterung auch, wenn nicht alle, so doch fast vollständig erkannt sein, soweit sie in den Gränzen derselben liegen. Die bei Bessel gefundenen habe ich im vorigen Bande gegeben, in dem gegenwärtigen wird man weiter unten ein ähnliches Fehlerverzeichniss für meine nördlichen Zonen finden, das der Lalandischen aber muss ich auf den nächsten Band versparen.

3.

Nach kleinen Berichtigungen, die entweder in den frühern Bänden schon angezeigt sind, oder am Ende gegenwärtiger Einleitung sich finden, enthalten die 3 Verzeichnisse resp. 110987, 105082 und 108129 einzelne Sterne, oder es ist die Totalsumme der in denselben enthaltenen

324198.

Wie diese sich auf die einzelnen Rectascensionen und Declinationen vertheilen, zeigen die folgenden Zusammenstellungen, in denen die Argumente in der ersten Verticalcolumne so zu verstehn sind, dass sie mit der angegebenen Zahl beginnen, und bis zur folgenden fortgehn; die 2te enthält die Zahl der Sterne, die dem Argumente entsprechen, die 3te diese dividirt durch den Flächenraum des Intervalls zwischen den beiden nächsten Argumenten, also die Sternfülle desselben, ausgedrückt durch die Zahl der Sterne, die sich darin durchschnittlich auf einen Quadratgrad vorfinden. Für das ganze Verzeichniss ist die durchschnittliche Sternfülle 15.19 oder nahe $15\frac{1}{5}$ Sterne auf einen Quadratgrad.

Vertheilung der Sterne nach der Rectascension.

u	′			u	′			u	′			u	′		
0	0	4707	15.9	3	0	3994	13.5	6	0	6712	22.6	9	0	3321	11.2
	20	4718	15.9		20	3973	13.4		20	6761	22.8		20	3082	10.4
	40	4653	15.7		40	3889	13.1		40	6535	22.0		40	3002	10.1
1	0	4542	15.3	4	0	3772	12.7	7	0	5603	18.9	10	0	2873	9.7
	20	4709	15.9		20	3824	12.9		20	4973	16.8		20	2676	9.0
	40	4586	15.5		40	4845	16.3		40	4634	15.6		40	2715	9.2
2	0	4495	15.2	5	0	5530	18.7	8	0	4256	14.4	11	0	2521	8.5
	20	4361	14.7		20	6252	21.1		20	3917	13.2		20	2608	[illegible]
	40	3941	13.3		40	6407	21.6		40	3623	12.2		40	2451	

12ᵘ	0′	2495	8.4	15ᵘ	0′	2832	9.6	18ᵘ	0′	6027	20.3
	20	2600	8.8		20	2965	10.0		20	6390	21.6
	40	2565	8.7		40	3158	10.7		40	6798	22.9
13	0	2527	8.5	16	0	3474	11.7	19	0	6980	23.5
	20	2627	8.9		20	3543	12.0		20	7896	26.6
	40	2630	8.9		40	3832	12.9		40	8165	27.5
14	0	2781	9.4	17	0	3946	13.3	20	0	7653	25.8
	20	2782	9.4		20	4732	16.0		20	7037	23.7
	40	2836	9.6		40	5148	17.4		40	6528	22.0

21ᵘ	0′	6114	20.6
	20	5866	19.8
	40	5542	18.7
22	0	5551	18.7
	20	5408	18.2
	40	5166	17.4
23	0	4775	16.1
	20	4783	16.1
	40	4585	15.5

Vertheilung der Sterne nach der Declination.

—	1°	4530	12.6	+21°	5026	15.0	+44°	4555	17.7	+67°	1601	11.6
—	0	4620	12.8		22	4957	14.9		45	4418	17.5		68	1429	10.8
+	0	5089	14.1		23	4855	14.6		46	4264	17.2		69	1383	11.0
	1	4832	13.4		24	4887	14.9		47	4383	18.0		70	1345	11.2
	2	4754	13.2		25	5073	15.6		48	4250	17.8		71	1251	11.0
	3	4935	13.7		26	4746	14.7		49	4339	18.6		72	1141	10.5
	4	5093	14.2		27	4680	14.7		50	4239	18.5		73	1073	10.5
	5	5263	14.7		28	4711	14.9		51	3786	16.9		74	1060	11.0
	6	5243	14.7		29	5065	16.2		52	3601	16.4		75	907	10.1
	7	5129	14.4		30	5092	16.4		53	3292	15.4		76	949	11.3
	8	5173	14.5		31	5039	16.4		54	3115	14.9		77	937	12.0
	9	5324	15.0		32	4774	15.7		55	3092	15.2		78	855	11.9
	10	5025	14.2		33	4837	16.1		56	3145	15.8		79	803	12.2
	11	5097	14.4		34	5068	17.1		57	2870	14.8		80	793	13.3
	12	5071	14.4		35	5173	17.7		58	2704	14.4		81	844	15.9
	13	5209	14.9		36	5155	17.8		59	2831	15.5		82	751	16.0
	14	5100	14.6		37	4937	17.3		60	2669	15.1		83	675	16.6
	15	4938	14.2		38	5118	18.2		61	2595	15.1		84	547	15.8
	16	5043	14.6		39	5223	18.8		62	2369	14.3		85	412	14.6
	17	5038	14.7		40	5236	19.1		63	2109	13.1		86	347	15.8
	18	5270	15.4		41	4939	18.3		64	1900	12.3		87	220	14.0
	19	5211	15.4		42	4838	18.2		65	2001	13.4		88	143	15.2
	20	5430	16.1		43	4638	17.8		66	1683	11.7		89	38	12.1

Diese Tafeln sind nur ein Auszug aus viel ausgedehnteren, die wir angelegt haben, in denen die Zahl der Sterne angegeben ist, die sich auf jeder Fläche von 1° Ausdehnung in Declination und in AR. bis 60° vom Aequator von 1°, von da ab bis 80° von 2°, nördlicher auf grösserer Ausdehnung befinden.

In beiden zeigt sich deutlich der Einfluss der Milchstrasse auf die Sternfülle der einzelnen Sectoren oder Zonen. Das Minimum derselben fällt, wenn man von den kleinen Unregelmässigkeiten absieht, ungefähr auf den Meridian von 12ᵘ, der nur wenige Grade vom Pol der Milchstrasse entfernt bleibt. Von hieraus wächst sie mit der Rectascension, Anfangs langsamer, dann rascher, bis sie ihr Maximum bei 19ᵘ 50′ erreicht, in welchen Meridian die Milchstrasse schon bei 7° der Declination eintritt, und mit einer kleinen Unterbrechung im Füchschen zwischen ihren beiden Zweigen bis 42°

verbleibt, und auf dieser Strecke im Halse und der Brust des Schwans zugleich ihre hellste Stelle hat. Anfangs rascher, dann langsamer zeigt sich nun wieder eine Abnahme bis 4^u 10′, wo die Milchstrasse zwischen Perseus und Fuhrmann schon durch ihren ungewöhnlich matten Schimmer als verhältnissmässig sehr sternarm sich kund giebt. Von hier aus nimmt die Sternfülle rasch wieder zu, und erreicht ein zweites Maximum bei 6^u 20′, mit welchem Meridiane die Milchstrasse bei ihrem Herabsteigen zum Aequator von etwa 20° nördlicher Declination bis zur südlichen Grenze des Verzeichnisses zusammenfällt, ohne aber so hell zu sein, wie im Schwan. Aus diesem Grunde so wie wegen der kürzern Ausdehnung des Zusammenfallens mit dem genannten Meridiane ist dies zweite Maximum auch nicht so stark, wie das erste. Es tritt nun wieder eine Anfangs raschere, dann langsamere Abnahme bis zum absoluten Minimum ein. Weniger auffallend ist diese Erscheinung in der nach den Declinationen geordneten Tafel, weil es unterhalb 60° keinen Parallel giebt, in dem nicht ein Theil der Milchstrasse sich befände. Aber dennoch zeigt sich ein wachsender Sternreichthum vom Aequator an, so wie die Milchstrasse immer schiefer und schiefer die einzelnen Parallele durchschneidet, und aus diesem Grunde immer länger in jedem einzelnen verweilt. Es sollte hiernach das Maximum eigentlich bei 52° eintreten, mit welchem Parallele die Milchstrasse auf die längste Strecke von 20^u 40′ bis 4^u, also über 7 Stunden lang zusammenfällt. Aber einmal die grössere absolute Ausdehnung der tiefern Parallele, wie die grosse Gedrängtheit der Sterne im Schwan bewirken, dass dasselbe schon bei 40° erreicht wird, die Sternfülle jedoch von da ab bis 62° nur langsam und mit Schwankungen abnimmt, und später erst rascher. Dass sich von 80° oder 81° eine zweite Zunahme zeigt, liegt nicht in einer wirklich grössern Sternfülle dieser Gegenden, sondern in dem oben erklärten Umstande, dass hier unser Verzeichniss viel mehr schwächere Sterne hat, als in den übrigen.

Um aber das Verhältniss der Sternfülle der einzelnen Himmelsgegenden zu ihrer Lage gegen die Milchstrasse noch deutlicher hervorzuheben, habe ich dieselbe in dem ganzen Zuge der Milchstrasse, so weit diese durch unsre Gränzen geht, an ihrem Nordpole und in verschiedenen Abständen von demselben untersucht. Ich habe dabei angenommen, dass der Pol derselben für 1855 in AR. 12^u 33′ bei 30° nördlicher Declination liege. Es ist dies ein Mittel zwischen der Angabe von Herschel 186° 52′ +31° 37′ *) und den Untersuchungen, die ich selbst früher über diesen Gegenstand angestellt habe **), und die 189° 41′ +28° 12′ ergaben. Das Trapez nun zwischen 12^u 23′ bis 12^u 43′ und 27° 30′ bis 32° 30′, welches diesen Punct in seiner Mitte hat, habe ich abgezählt, indem ich zugleich auf die Grössen der einzelnen Sterne Rücksicht nahm. Dabei habe ich die Sterne von den Grössen 9.5 bis 8.6 zur 9^m., die von 8.5 bis 7.6 zur 8^m., die von 7.5 bis 6.6 zur 7^m. gerechnet, und alle hellern in eine einzige Abtheilung zusammengefasst, die wenigen Nebelflecke und veränderlichen Sterne aber gar nicht berücksichtigt. Bei dieser Art der Vertheilung ist freilich die Classe der Sterne 9^m. zu gross geworden, indem unsere Sterne von den Grössen 9.5 und 9.4, vielleicht auch noch die von 9.3 nicht mehr zur 9^m. zu zählen sind. Indess wollte ich nicht zu viele Classen machen, da die Vertheilung der Sterne unter dieselben bei der Mangelhaftigkeit der Grössenschätzungen doch immer unsicher bleibt, und wäre auch die Classe 10^m. gar zu unvollständig ausgefallen. Eben solche Flächenräume von 25° auf dem Parallel, die also auf den grössten Kreis reducirt immer eine geringere Fläche bildeten, wurden bei 30°, 50°, 70°, 105°, 125° und 140° Abstand von dem für den Pol der Milchstrasse angenommenen Puncte untersucht. Es wäre eine zu grosse Arbeit gewesen, hätte man die vollständigen

*) Abgeleitet aus der Angabe von Herschel 186° +32° für 1785. Philosophical Transactions for 1785. p. 253.

**) Ueber die eigene Bewegung des Sonnensystems §. 7 nämlich 189° +28° 30′ für 1800, abgeleitet aus dem ganzen Zuge der Milchstrasse nach Bodes Uranographie. Der nördliche Theil derselben allein würde für 1800 geben 189° 15′ +31° 28′ und also näher mit Herschels Angabe stimmen.

Zonen in den angenommenen Abständen und in einer entsprechenden Breite untersuchen wollen; ich habe daher nur gewisse in regelmässigen Distanzen von einander liegende Declinationen genommen, und zwar immer dieselben östlich und westlich vom Pole der Milchstrasse. Dagegen habe ich den Zug der Milchstrasse möglichst vollständig abgezählt, so weit sie in unsre Gränzen fällt, und wo sie doppelt ist, auch den zwischen den beiden Aesten eingeschlossenen Raum. Es stellte sich aber sehr bald heraus, dass das Trapez um den Pol der Milchstrasse keinesweges die sternärmste Gegend des Himmels ist, sondern dass sich viele andre Gegenden finden, welche in derselben Flächenausdehnung noch weniger Sterne enthalten. Die folgende Zusammenstellung wird mehrere Beispiele davon zeigen; ich habe aber ausserdem 5 solcher Gegenden aufgesucht, welche wohl so ziemlich die sternärmsten sein werden; sie liegen meistentheils ziemlich nahe dem Pole der Milchstrasse, nur grade die ärmste an den Hörnern des Stiers steht nur 22° von der Milchstrasse selbst ab, aber freilich von der sternärmsten Gegend derselben. Alle diese Abzählungen sind nun in der folgenden Zusammenstellung enthalten, und zwar giebt die erste Columne die Rectascension und Declination der Mitte des untersuchten Trapezes, die zweite die in dessen Raume befindliche Zahl der Sterne 9m., die dritte die der 8m., die vierte die der 7m., die fünfte die der hellern, die sechste die Totalsumme, die siebente den Flächenraum in Quadratgraden des grössten Kreises und die achte die aus der Division der Zahlen der siebenten in die der sechsten Columne geschlossene Sternfülle, also die Zahl von Sternen, die sich auf einem Quadratgrad des grössten Kreises befinden, und zwar mit 2 Decimalen; ich bemerke dabei noch, dass in einigen Gegenden der Milchstrasse, bei denen vor der Rectascension ein Sternchen steht, die Trapeze nicht in allen Declinationen mit derselben AR. anfangen, sondern weil die Milchstrasse dort sehr schief gegen die Meridiane liegt, mit verschiedenen in verschiedenen Declinationen. Von den zuerst angegebenen 6 Trapezen ist das erste das um den Pol, die andern 5 sind die ärmsten, und ihre Abstände vom Pole der Reihe nach 100°.1, 13°.0, 11°.6, 18°.6, 18°.9.

Position.	9m.	8m.	7m.	hell.	Summe.	Areal.	Sternfülle.	Position.	9m.	8m.	7m.	hell.	Summe.	Areal.	Sternfülle.
							Der Pol und die ärmsten Gegenden.								
u ′ °						°		u ′ °						°	
12 33 +30	149	25	10	1	185	21.64	8.55	11 58 +21.5	135	15	9	2	161	23.25	6.92
4 26 +27.5	111	11	4	5	131	22.17	5.91	13 10 +13.5	145	22	3	4	174	24.30	7.16
11 42 +37.5	105	18	4	6	133	19.83	6.71	12 2 +12.5	148	29	2	1	180	24.40	7.38
		östlich					30° vom Pol				westlich				
12 56 + 0.5	180	26	3	—	209	24.99	8.36	12 10 + 0.5	180	23	4	3	210	24.99	8.40
14 11 +10.5	209	16	7	2	234	24.57	9.52	10 55 +10.5	188	19	4	2	213	24.57	8.67
14 39 +20.5	194	31	8	6	239	23.41	10.21	10 27 +20.5	163	26	10	—	199	23.41	8.50
14 52 +30.5	159	25	7	2	193	21.53	8.96	10 14 +30.5	200	27	12	3	242	21.53	11.35
14 52 +40.5	137	21	7	4	169	19.00	8.89	10 14 +40.5	141	29	9	3	182	19.00	9.58
14 30 +50.5	112	21	8	3	144	15.90	9.06	10 36 +50.5	106	19	5	3	133	15.90	8.37
		östlich					50° vom Pol				westlich				
15 23 + 0.5	176	19	5	5	205	24.99	8.20	9 43 + 0.5	197	35	6	1	239	24.99	9.56
16 3 +15.5	243	43	9	3	298	24.08	12.37	9 3 +15.5	292	25	5	1	323	24.08	13.41
16 27 +30.5	231	25	9	2	267	21.53	12.40	8 39 +30.5	223	24	10	7	264	21.53	12.26
16 40 +45.5	168	27	7	5	207	17.52	11.82	8 26 +45.5	157	24	9	5	195	17.52	11.13
16 41 +55.5	117	22	5	5	149	14.16	10.53	8 25 +55.5	113	17	9	2	141	14.16	9.96
16 27 +65.5	91	14	5	1	111	10.36	10.71	8 39 +65.5	85	14	5	2	106	10.36	10.23
16 7 +70.5	58	11	5	2	76	8.34	9.11	8 59 +70.5	60	11	4	3	78	8.34	9.35
15 25 +75.5	44	12	3	—	59	6.26	9.43	9 41 +75.5	49	5	2	1	57	6.26	9.11

östlich									westlich								
								70° vom Pol									
u	′	°							u	′	°						
17	1	+ 0.5	267	13	5	7	292	24.99	11.68	8	5	+ 0.5	424	62	6	—	492	24.99	19.69
17	35	+15.5	377	40	11	9	437	24.08	18.15	7	31	+15.5	387	32	4	8	431	24.08	17.90
18	6	+30.5	375	31	12	7	425	21.53	19.74	7	0	+30.5	345	33	13	4	395	21.53	18.34
18	39	+45.5	298	46	16	5	365	17.52	20.84	6	27	+45.5	247	25	9	3	284	17.52	16.21
19	6	+55.5	226	35	7	5	273	14.16	19.29	6	0	+55.5	127	21	8	—	156	14.16	11.02
19	46	+65.5	156	29	8	1	194	10.36	18.72	5	20	+65.5	66	15	6	1	88	10.36	8.49
20	19	+70.5	66	18	4	1	89	8.34	10.67	4	47	+70.5	72	25	1	2	100	8.34	11.99
21	17	+75.5	59	4	5	3	71	6.26	11.35	3	49	+75.5	61	8	2	4	75	6.26	11.99
								105° vom Pol									
19	44	+ 0.5	430	37	6	1	474	24.99	18.97	5	22	+ 0.5	547	45	15	11	618	24.99	24.73
20	10	+10.5	514	48	13	6	581	24.57	23.64	4	56	+10.5	365	32	11	4	412	24.57	16.77
20	42	+20.5	510	62	14	5	591	23.41	25.25	4	24	+20.5	235	23	8	12	278	23.41	11.88
21	27	+30.5	407	60	11	2	480	21.53	22.29	3	39	+30.5	210	28	5	6	249	21.53	11.56
21	58	+35.5	326	44	13	2	385	20.35	18.92	3	8	+35.5	261	58	14	3	336	20.35	16.51
22	43	+40.5	354	47	12	9	422	19.00	22.21	2	23	+40.5	321	54	19	2	396	19.00	20.84
0	33	+45.0	370	38	18	7	433	17.67	24.50										
								125° vom Pol									
21	20	+ 0.5	220	31	5	1	257	24.99	10.28	3	46	+ 0.5	178	36	10	5	229	24.99	9.16
21	38	+ 5.5	259	36	6	6	307	24.88	12.34	3	28	+ 5.5	205	32	6	1	244	24.88	9.81
21	58	+10.5	308	28	10	5	351	24.57	14.28	3	8	+10.5	161	29	8	5	203	24.57	8.26
22	25	+15.5	301	28	9	2	340	24.08	14.12	2	41	+15.5	256	25	7	8	296	24.08	12.29
23	5	+20.5	201	28	12	6	247	23.41	10.55	2	1	+20.5	184	25	5	7	221	23.41	9.44
0	33	+25.0	236	32	10	7	285	22.65	12.58										
								140° vom Pol									
22	44	+ 0.5	175	25	9	2	211	24.99	8.44	2	22	+ 0.5	229	32	6	3	270	24.99	10.80
23	16	+ 5.5	176	28	6	3	213	24.88	8.56	1	50	+ 5.5	199	24	8	—	231	24.88	9.29
0	33	+10.0	203	21	8	2	234	24.61	9.51										
								ungetheilte Milchstrasse									
*21	2	+47.5	475	66	19	8	568	16.88	33.64	* 3	36	+45.5	252	39	13	6	310	17.52	17.69
*21	22	+47.5	496	83	19	12	610	16.88	36.13	* 4	20	+40.5	301	38	10	5	354	19.00	18.63
23	55	+56.5	260	54	13	7	334	13.79	24.21	* 4	52	+35.5	340	32	13	12	397	20.35	19.51
0	15	+56.5	290	51	20	1	362	13.79	26.24	* 5	28	+30.5	482	51	16	5	554	21.53	25.74
0	35	+56.5	289	45	9	5	348	13.79	25.23	* 5	44	+25.5	615	64	14	6	699	22.56	30.99
0	55	+56.5	298	38	14	6	356	13.79	25.81	* 5	52	+20.5	642	57	12	6	717	23.41	30.64
1	15	+56.5	348	36	8	3	395	13.79	28.64	* 6	4	+15.5	607	57	11	11	686	24.08	28.46
1	35	+56.5	367	31	17	5	420	13.79	30.45	* 6	16	+10.5	631	55	11	4	701	24.57	28.52
1	55	+56.5	409	49	9	2	469	13.79	34.00	* 6	28	+ 5.5	697	71	16	3	787	24.88	31.60
* 2	52	+50.5	266	39	9	9	323	15.90	20.31	* 6	36	+ 0.5	790	54	7	4	855	24.99	34.20
								nördlicher Zweig Milchstrasse südlicher Zweig									
*17	51	+ 2.5	430	50	9	10	499	24.97	19.99	18	58	+ 0.5	446	46	17	5	514	24.99	20.57
*17	56	+ 7.5	490	24	15	3	532	24.78	21.47	19	14	+ 5.5	550	42	12	2	606	24.88	24.36
18	30	+12.5	519	47	18	4	588	24.40	24.10	19	32	+10.5	640	64	15	5	724	24.57	29.46
18	50	+17.5	578	60	18	9	665	23.74	27.89	19	52	+15.5	563	69	17	11	660	24.08	27.40
19	10	+22.5	441	62	12	9	524	23.09	22.69	20	2	+20.5	576	62	16	8	662	23.41	28.28
*19	20	+27.5	536	49	19	8	612	22.18	27.60	20	10	+25.5	535	70	11	10	626	22.56	27.75
*19	36	+32.5	679	80	24	7	790	21.08	37.49	*20	37	+30.5	591	57	16	8	672	21.53	31.21
*19	56	+37.5	712	77	25	7	821	19.83	41.41	*20	57	+35.5	616	64	12	7	699	20.35	34.35
*20	8	+42.5	592	74	30	5	701	18.43	38.04	*21	17	+40.5	567	61	16	6	650	19.00	34.20

zwischen beiden Zweigen der Milchstrasse

18u 20′	+ 0.5°	308	38	5	2	353	24.99°	14.13	*19u 40′	+25.5°	558	67	20	6	651	22.56°	28.86
18 30	+ 5.5	652	57	20	4	733	24.88	29.46	*20 2	+30.5	623	77	21	4	725	21.53	33.67
*19 2	+10.5	480	63	17	7	567	24.57	23.07	*20 28	+35.5	608	70	11	5	694	20.35	34.11
*19 19	+15.5	509	63	21	12	605	24.08	25.12	20 42	+40.5	498	75	22	8	603	19.00	31.73
*19 30	+20.5	574	58	28	5	665	23.41	28.41	*21 52	+56.5	257	33	13	8	311	13.79	22.55

Nehmen wir von den einzelnen Abtheilungen dieser Zusammenstellung die Summe, so erhalten wir, auf dieselbe Weise geordnet wie dort, die folgenden Zahlen:

die 5 ärmsten Trapeze	644	95	22	18	779	113.95°	6.84
am Pol	140	25	10	1	185	21.64	8.55
30° vom Pol	1969	283	84	31	2367	258.80	9.15
50° vom Pol	2304	328	98	45	2775	254.48	10.90
70° vom Pol	3553	437	117	60	4167	254.48	16.37
ungetheilte Milchstrasse	8855	1010	260	120	10245	335.66	30.52
nördlicher Zweig	4977	523	170	62	5732	202.50	28.31
südlicher Zweig	5084	535	132	62	5813	205.37	28.31
zwischen der Milchstrasse	5067	601	178	61	5907	219.16	26.95
105° vom Pol	4850	576	159	70	5655	285.37	19.82
125° vom Pol	2509	330	88	53	2980	266.51	11.18
140° vom Pol	982	130	37	10	1159	124.35	9.32
die ganze Milchstrasse	18916	2068	562	244	21790	743.53	29.31

Betrachten wir diese Tabellen näher, so sehen wir zunächst, dass im Allgemeinen der Sternreichthum von der Milchstrasse aus nach ihren beiden Polen zu ziemlich regelmässig abnimmt, zugleich aber auch finden wir das schon oben Ausgesprochene bewahrheitet, dass nämlich die Gegend um den Pol der Milchstrasse nicht die sternärmste ist; wir treffen ausser den absichtlich aufgesuchten 5 ärmsten Trapezen noch 8 andre an, die weniger Sterne auf dem Quadratgrade haben, als die Gegend um den Pol. Obgleich man kaum annehmen kann, dass dies von der mangelhaften Beobachtung herrührt, so habe ich doch, um hierüber grössere Gewissheit zu erlangen, die Gegenden sowohl um den Pol, als auch um die Mittelpuncte jener 5 Trapeze in einem grössern Umkreise untersucht, indem ich nämlich Trapeze von 10° Seite genommen habe, die also 100 Quadratgrade des Parallels umfassen. Es zeigt sich hierbei, dass zwar alle diese 6 Gegenden in weiterm Umfange etwas sternreicher sind, als im engern, aber das Verhältniss bleibt mit alleiniger Ausnahme der früher ärmsten Gegend nahe dasselbe. In derselben Ordnung, wie in der frühern Tabelle, erhält man nämlich nun die folgenden Zahlen:

12u 33′	+30°	624	105	34	20	783	86.49°	9.05	11u 58′	+21.5°	621	79	39	10	749	91.94°	8.15
4 26	+27.5	692	80	31	22	825	88.59	9.21	13 10	+13.5	694	91	21	11	817	97.12	8.41
11 42	+37.5	536	83	22	15	656	79.24	8.28	12 2	+12.5	659	108	14	8	789	97.51	8.09

Die Zahlen dieser 6 Trapeze beruhen aber auf wenigstens 10 verschiedenen Zonen, beobachtet von verschiedenen Beobachtern, zu zum Theil bedeutend verschiedenen Zeiten, unter zuweilen sehr ungleichen oder wechselnden äussern Umständen. Dass unter solchen Verhältnissen ihre Sternarmuth nur scheinbar sein sollte, ist im höchsten Grade unwahrscheinlich, und wir werden dadurch zu dem Schlusse geführt, dass die Vertheilung der Sterne am Himmel auch auf grössere Ausdehnungen eine unregelmässige ist. Zu demselben Schlusse gelangen wir bei der Betrachtung der Sternfüllen, die bei demselben Abstande vom Pole der Milchstrasse, aber in verschiedenen Richtungen sich ergeben; wir sehn, dass diese oft nicht unbedeutend von einander abweichen, und dass die Unterschiede zwischen den ärmsten und reichsten Gegenden bei demselben Polabstande im Allgemeinen mit der Annäherung an die Milchstrasse zunehmen, in dieser selbst ihr Maximum erreichen, so sehr, dass die reichsten

Gegenden der letztern die ärmsten um mehr als das Doppelte übertreffen. Zugleich aber finden wir, dass diese Unterschiede nicht sprungweise auftreten, sondern ziemlich regelmässig wachsen und abnehmen, und meistentheils zwei Maxima und zwei Minima darbieten. Und zwar liegen diese Maxima und Minima, wenigstens in den der Milchstrasse nächsten Parallelen, nahezu auf den Richtungen von den Maximis und Minimis der Milchstrasse selbst nach den Polen zu. So wird die sternärmste Gegend der Milchstrasse nach einer ungefähren Interpolation auf den Punct $3^u\ 50'\ +44^0$ fallen. Der Winkel, den die grössten Kreise von diesem Puncte und vom Nordpole nach dem Pol der Milchstrasse an dem letztern Puncte bilden, und den ich M nenne, beträgt $33^0\ 5'$, und wenn ich nun die Puncte aufsuche, welche vom Pol der Milchstrasse nach dem erstgenannten Puncte hin um 30^0, 50^0, 70^0, 105^0, 125^0 und 140^0 abstehn, so finde ich für dieselben respective folgende Positionen: $10^u\ 46'\ +52^0\ 44'$, $8^u\ 31'\ +61^0\ 19'$, $5^u\ 50'\ +58^0\ 31'$, $3^u\ 13'\ +34^0\ 51'$, $2^u\ 29'\ +17^0\ 55'$, $1^u\ 55'\ +4^0\ 14'$. Entnehmen wir für diese Puncte aus unsern Tafeln durch rohe Interpolation die Sternfüllen, so finden wir für das Parallel von 30^0 etwa 8.2 ein absolutes Minimum, für 50^0 10.1, nicht das Minimum, aber doch eine sehr kleine Zahl, für 70^0 10.0, nächst der Fülle 8.49 des zunächst liegenden Punctes $5^u\ 20'\ +65^0.5$ die kleinste Zahl. Auf der andern Seite der Milchstrasse finden wir für den angegebenen Punct des Parallels von 105^0 die Sternfülle 16.0, die auch nur die der beiden nächstvorhergehenden Trapeze der Tafel übertrifft. Für 125^0 finden wir etwa 10.8; es scheint hier eine zufällige Unregelmässigkeit die Sterne um $2^u\ 41'\ +15^0.5$ angehäuft zu haben, die sich auch noch bis zu dem Parallel von 140^0 fortterstreckt, wo für den gegebenen Punct die Sternfülle etwa 9.7 resultiren wird, die nur von der nächstvorhergehenden übertroffen wird. Das Maximum der Sternfülle der Milchstrasse trifft kurz vor der Vereinigung beider Zweige ein, und wenn wir auf die Sternfüllen beider rücksichtigen, werden wir es auf $20^u\ 35'\ +36^0.5$ setzen können. Dies entspricht einem $M = 45^0 14'$, und die entsprechenden Puncte der einzelnen Parallele fallen hiermit resp. auf die Puncte $14^u\ 40'\ +47^0\ 33'$, $16^u\ 44'\ +52^0\ 16'$, $18^u\ 45'\ +48^0\ 5'$, $21^u\ 11'\ +27^0\ 22'$, $22^u\ 7'\ +12^0\ 17'$ und $22^u\ 44'\ +0^0\ 31'$. Für diese finden wir die Sternfüllen bei 30^0 Abstand vom Pol 9.0, bei 50^0 11.2, bei 70^0 20.5, bei 105^0 23.4, bei 125^0 14.2, bei 140^0 8.4; sie gehören mit Ausnahme der ersten und letzten alle zu den stärksten, die wir bei den respectiven Abständen vom Pole antreffen. Ganz dieselbe Erscheinung zeigt sich uns in den beiden Aesten der Milchstrasse und dem sie trennenden Zwischenraume; in allen 3 Zügen finden wir vom Aequator ausgehend Anfangs eine Zunahme der Sternfülle, dann eine kleine Abnahme, darauf wieder eine starke Zunahme, die kurz vor der Vereinigung der beiden Aeste ihr Maximum erreicht, und dann wieder in eine Abnahme übergeht. Wir werden durch diese Thatsachen zu dem Resultate geführt, dass die Sterne bis zu den Grössen hinab, welche unsrer Untersuchung noch zu Grunde liegen, in auf die Milchstrasse ungefähr senkrechte Schichten vertheilt sind, die in dieser selbst das Maximum ihrer Dichtigkeit erreichen, nach beiden Seiten hin ziemlich rasch dünner werden, aber sich noch weit von der Mitte, oft bis nahe an die Pole hin verfolgen lassen. Dies stimmt also sehr gut mit der Ansicht von Herschel, dass die Milchstrasse aus verschiedenen Ansammlungen, gleichsam verschiedenen Systemen bestehe, die sich ihrem Zuge nach aufeinander folgen, dehnt aber diese Ansicht wenigstens für unsre Sterne noch über die Grenzen der Milchstrasse aus.

Noch zu einem andern interessanten Schlusse führt uns die Betrachtung des Zwischenraumes zwischen den beiden Zweigen der Milchstrasse; wir finden seine Sternfülle nur wenig, im Mit
um $\frac{1}{11}$ geringer, als die der beiden ihn einschliessenden Aeste selbst, ja in dem Trapez von 18
sogar bedeutend stärker, und vergleichen wir sie mit denen andrer Theile der Milchstr
wir, dass mit Ausnahme des ersten Trapezes alle übrigen relativ mehr Sterne enthalte
Zug jener durch den Perseus und Fuhrmann, und doch dürfte selbst das lichtstär
Stande sein, in diesem Zwischenraume auch nur eine Spur jenes matten Lichtschi

durch den sich selbst die angedeutete schwach leuchtende Stelle der Milchstrasse so auffallend gegen den Himmelsgrund auszeichnet. Dadurch wird also erwiesen, dass die schwächsten Sterne in der Milchstrasse unverhältnissmässig mehr zusammengedrängt sind, als diejenigen, die ein Cometensucher von 34 Linien Oeffnung unter günstigen Umständen erkennen lässt. Ob diese Zusammendrängung eine wirkliche ist, oder nur scheinbar entstanden daraus, dass unser Sternsystem in der Milchstrasse viel weiter in die Tiefe des Himmels hineinreicht, als in diesem Zwischenraume, wie Herschel es ansieht, darüber kann unsre Zusammenstellung natürlich keinen Aufschluss geben.

Wir können aber mit Hülfe unsrer obigen Tafeln noch einen Schritt weiter gehn, indem wir das Verhältniss aufsuchen, in dem die Zahl der Sterne von verschiedenen Grössenclassen in den einzelnen Gegenden des Himmels zu einander steht. In den einzelnen Trapezen eine Regelmässigkeit hierbei zu finden, dürfen wir zwar nicht erwarten, da in jedem einzelnen, selbst den reichsten, dazu die Zahl der Sterne, die sie enthalten, zu gering ist, aber die nähere Betrachtung der Summen in der zweiten Tafel wird uns zu einem zuverlässlicheren Resultate führen, da sie meistens schon eine ziemliche Anzahl von Sternen enthalten. Nur für die sternärmsten Gegenden, den Pol der Milchstrasse und die Abstände von demselben von 30° und 140° ist die Zahl namentlich der hellern Sterne so gering, dass hier der Zufall noch einen zu grossen Spielraum hat. Desshalb habe ich für die erstern den Trapezen von 25° die von 100° Ausdehnung substituirt, für den Abstand 30° noch die zwischenliegenden Trapeze untersucht, für den Abstand von 140° aber sämmtliche in der Durchmusterung vorkommende Sterne zu Rathe gezogen, welche bis 2½ Grad zu beiden Seiten des genannten Parallels abstehn. Die Resultate der beiden letztgenannten Untersuchungen gebe ich in der folgenden Tafel, und zwar die für den Abstand von 30° in derselben Bezeichnungsart, wie früher, die für den Abstand von 140° aber so, dass die erste Zahlenreihe die Sterne der untersuchten Zonen enthält, die zwischen —2° und +3° westlich von 0ᵘ der AR. sich befinden, die 2te die östlich von diesem Meridian zwischen denselben Parallelen zusammen gezählten, die 3te und 4te ebenso die Sterne zwischen +3° und +7°, die 5te die Sterne zwischen +7° und +9°, die 6te die zwischen +9° und +12°.5. Die Flächenräume sind aus der Charte entnommen und auf den grössten Kreis reducirt; ihre Summe ist 329.74, während die Rechnung für den ganzen Gürtel, so weit er in die Grenzen der Durchmusterung fällt, 329°.60 ergeben hat, als Controlle für die erste Berechnung.

			östlich						30° vom Pol						westlich			
ᵘ	′	°								ᵘ	′	°						
13	46	+ 5.5	191	16	5	2	214	24.88	8.60	11	20	+ 5.5	188	22	9	3	222	24.88	8.92
14	28	+15.5	192	17	7	3	219	24.08	9.09	10	38	+15.5	193	36	5	3	237	24.08	9.84
14	48	+25.5	168	26	12	4	210	22.56	9.31	10	18	+25.5	182	22	10	3	217	22.56	9.62
14	54	+35.5	174	18	9	3	204	20.35	10.02	10	12	+35.5	151	27	6	5	189	20.35	9.29
14	45	+45.5	122	29	9	2	162	17.52	9.25	10	21	+45.5	133	20	5	1	159	17.52	9.08
14	2	+55.5	106	22	7	2	137	14.16	9.68	11	4	+55.5	88	15	11	2	116	14.16	8.19
13	5	+59.5	93	26	4	1	124	12.68	9.78	12	1	+59.5	79	15	5	2	101	12.68	7.96

Diese 14 Trapeze zusammen genommen geben nun folgende Zahlen:

2060 | 311 | 104 | 36 | 2511 | 272.46 | 9.22

vereinigt man sie mit den Summen der früher angeführten 12 Trapeze, so erhält man die ganzen Summen für den Abstand 30° vom Pol:

4029 | 594 | 188 | 67 | 4878 | 531.26 | 9.18

140° vom Pol

+0.5 östlich	380	55	10	6	451	41.61	10.84
+0.5 westlich	301	52	12	5	370	41.61	8.89
+5 östlich	389	57	11	2	459	46.12	9.95
+5 westlich	333	55	10	7	405	46.12	8.78
+8	690	86	31	9	816	73.65	11.08
+10.25	631	81	27	10	749	80.63	9.29
Summe	2724	386	101	39	3250	329.74	9.86

Substituirt man diese Endsummen statt der frühern, so erhält man die folgende Zusammenstellung, in der die erste Columne die Zahl der sämmtlichen in den betreffenden Gegenden vorkommenden Sterne enthält, die drei folgenden die Zahl der darunter resp. 6m. oder heller, 7m. und 8m. geschätzten, und die drei dann folgenden die Quotienten mit zwei Decimalen angeben, welche man erhält, wenn man mit den Zahlen resp. der 2ten bis 4ten Columne in die der ersten dividirt, also die Verhältnisszahlen der allgemeinen Sternfülle zu den Sternfüllen für die drei Grössenclassen. Diese selbst endlich ist in der 8ten Columne enthalten.

	Alle.	hell.	7m.	8m.	hell.	7m.	8m.	Sternfülle.
Pol der Milchstrasse	783	20	34	105	39.15	23.03	7.46	9.05
die sternärmsten Gegenden	3836	66	127	441	58.12	30.20	8.70	8.44
30° vom Pol der Milchstrasse	4878	67	188	594	72.81	25.95	8.21	9.18
140° vom Pol der Milchstrasse	3250	39	101	386	83.33	32.18	8.42	9.86
50° vom Pol der Milchstrasse	2775	45	98	328	61.67	28.32	8.46	10.60
125° vom Pol der Milchstrasse	2980	53	88	330	56.18	33.84	9.03	11.18
70° vom Pol der Milchstrasse	4167	60	117	437	69.45	35.62	9.54	16.37
105° vom Pol der Milchstrasse	5655	70	159	576	80.79	35.57	9.82	19.82
zwischen den Aesten der Milchstrasse	5907	61	178	601	96.84	33.19	9.83	26.95
Milchstrasse	21790	244	562	2068	89.30	38.95	10.54	29.31
der Theil bis zur Fülle 24.5	5548	79	158	536	70.23	35.11	10.35	21.48
der Theil von der Fülle 34.0 an	5595	50	142	542	111.90	39.40	10.32	36.25

Wir sehn aus dieser Tafel, dass die Verhältnisszahlen in der 5ten bis 7ten Columne vom Pol aus nach der Milchstrasse nicht unbedeutend zunehmen mit einer Regelmässigkeit, die auch bei den Sternen 6m. und 7m. in Betracht der meistens ziemlich geringen Zahlen derselben vollkommen genügend erscheint, und zwar tritt diese Zunahme um so stärker hervor, je heller die Sterne sind. Die Verhältnisse für die Sterne 6m. und 7m. dürften in der Gegend des Pols der Milchstrasse zu klein ausgefallen sein, indem diese zu grossem Theile mit dem gedrängtesten Haufen der Coma Berenices zusammenfällt, die wohl nicht zufällig diese Gedrängtheit zeigt; wollen wir die Verhältnisszahlen für die genannten beiden Classen und den Pol resp. 50 und 24 annehmen, so würden sie besser in die Reihe der übrigen passen, und dann erhielten wir das Verhältniss dieser Zahlen, wie sie am Pol sind, zu denen, die in der Milchstrasse Statt finden, für die hellern Sterne wie 1 : 1.79, für die 7m. wie 1 : 1.62, für die 8m. wie 1 : 1.41 und endlich für die 9m. wie 1 : 0.92. Es tritt also diese für Sterne von bedeutend verschiedenen Grössen schon früher erkannte Erscheinung selbst für so geringe Grössenunterschiede deutlich hervor. Sie ist eine natürliche Folge des Umstandes, dass die Sterne, die sich in einem bestimmten gleichen Abstande von uns befinden, von sehr verschiedener absoluter Grösse

oder Leuchtkraft sind *), was hier auf dasselbe hinaus kommt, und dass also von den Sternen einer gewissen scheinbaren Grösse wohl nur ein kleiner Theil sich in der Entfernung von uns befindet, für welche jene scheinbare Grösse die mittlere ist, ein anderer Theil aus schwächern uns nähern, aber der grösste Theil wohl aus den hellern unter den weiter entfernten besteht, so dass also nicht die scheinbare Grösse der schwächsten in einer Gegend sichtbaren Sterne selbst es ist, die uns Aufschlüsse über die Grenzen unseres Systems in derselben giebt, sondern vielmehr das Verhältniss der Zahl dieser schwächsten zu der Zahl der hellern.

Bei unserer Betrachtung der Tafel werden wir aber zu der wahrscheinlichen Vermuthung geführt, dass weniger die Stellung gegen die Milchstrasse diese Verhältnisse bedingt, als vielmehr die absolute Sternfülle der Gegend. Es tritt dies am deutlichsten hervor, wenn wir die letzten beiden Reihen der Tafel vergleichen, in welchen resp. die Gegenden der Milchstrasse, welche eine Sternfülle bis 24.5 haben, und diejenigen zusammengezogen sind, deren Sternfülle 34.0 erreicht oder übertrifft. Ich habe daher noch eine andre Zusammenstellung gemacht, indem ich die einzelnen Gegenden nach ihrer Sternfülle ordnete, und nun das Ganze in 4 Gruppen so theilte, dass die Zahl der Sterne in den einzelnen Gruppen nahe gleich wurde. Das Resultat dieser Zusammenstellung enthält die folgende Tafel, deren Anordnung im Uebrigen der der vorigen gleich ist, nur dass ich noch das Areal der einzelnen Gruppen hinzugefügt habe.

Gruppe.	Alle.	hell.	7^m.	8^m.	hell.	7^m.	8^m.	Sternfülle.	Areal.
I. bis zur MF. 10.7	13926	222	497	1718	62.73	28.02	8.11	9.00	1547.91
II. MF. 10.7 bis 21.0	14023	207	408	1461	67.74	34.37	9.60	15.06	931.37
III. MF. 21.0 bis 28.6	14089	175	394	1353	80.51	35.76	10.41	25.36	555.48
IV. MF. über 28.6	13983	121	353	1334	115.56	39.61	10.48	32.97	424.08

Hier tritt nun sowohl die Zunahme des Verhältnisses mit der Sternfülle als auch die stärkere Zunahme bei den hellern Sternen aufs Deutlichste hervor. Weitere Schlüsse über die Constitution unseres Sternhaufens daraus zu ziehn, würde schwerlich gelingen, ohne die Herschel'schen Sternaichungen mit zu berücksichtigen. Ja es ist sehr die Frage, ob mit Zu-Ratheziehung derselben allein ein günstiges Resultat sich erzielen liesse, und ob es hierzu nicht nöthig sein würde, als Mittelglieder ähnliche Aichungen auch mit schwächern Fernröhren, als das 20füssige Spiegeltelescop, anzustellen.

4.

Wie für die frühern Abtheilungen des Sternverzeichnisses habe ich auch für die in dem gegenwärtigen Bande enthaltenen die wahrscheinlichen Fehler unsrer Bestimmungen gesucht, indem ich

*) Die Parallaxe des Sterns LL. 21185 ist nach Winnecke das Doppelte von der der Wega; er würde also, in gleiche Entfernung mit dem letztern versetzt, nur ein Viertel seines jetzigen Lichtes haben, d. h. wir würden statt eines Sterns gut 7.8^m, wie er jetzt sich uns zeigt, einen gut 9^m. in gleichem Abstande mit einem der hellern erster Grösse sehn, und man dürfte doch schwerlich behaupten können, dass dies schon die Extreme sind, zumal bis jetzt ausser an α Centauri noch an keinem Sterne 1^m. eine gleich grosse Parallaxe wie an Wega erkannt ist. Nehmen wir die von Peters für Arcturus abgeleitete Parallaxe von 0″.12 als richtig an, so würden die Gränzen sich gleich noch um weitere $1^1/_2$ Grössenclassen ausdehnen. Ausserdem zeigen ja auch die veränderlichen Sterne, wie ausserordentlich verschieden die Leuchtkraft derselben sein kann.

alle Sterne aus den Zonen +60°, 75° und 76°, die sonst sicher bestimmt und bei uns wenigstens zweimal beobachtet sind ohne zu einem Zweifel irgend einer Art Veranlassung zu geben, mit diesen genauern Positionen verglichen habe. Die Resultate dieser Untersuchungen sind die folgenden:

Für 60°.5 sind im Ganzen 823 Sterne verglichen worden, nämlich 167 aus solchen Gegenden, in denen Revisionszonen beobachtet sind, und 656 die bloss auf Cometensucherzonen beruhen. Die mittlere Correction ist in AR. für die erstere —0".09, für die letztere +0".09, im Mittel aus allen +0".05, in Decl. für beide nur einige Tausentel der Minute positiv, also in beiden Coordinaten als 0 anzunehmen. Die positive Correction in AR. aus den Cometensucherzonen rührt fast allein von den 11 grössten positiven Correctionen her, die keine entsprechenden negativen haben, und würde auf +0".009 herunterkommen, wenn man diese ausschliessen wollte. Dergleichen Erscheinungen werden wir bei den Vergleichungen aus den Zonen von 75° und 76° wieder begegnen, und auch in der Zone 37° hat sie sich gezeigt; die stärksten Correctionen in AR. waren auch dort positive, über 4" kamen nur 5 positive vor, zwischen 3" und 4" auch noch 4 positive gegen 3 negative, so dass wenn man die Sterne, die eine stärkere Correction als 4" erfordern, ausschliessen wollte, die mittlere Correction von +0".11 auf +0".07 herunter kommen würde *). Es sind diese Fehler wohl so entstanden, dass der Beobachter, wenn mehrere Sterne nahe zu gleicher Zeit eintreten wollten, in der Befürchtung einen Eintritt zu verlieren, ihn zu früh ausrief, was besonders bei schwachen Sternen leicht geschehn konnte. Der entgegengesetzte Fehler, dass nämlich ein Stern, dessen Declination schon aufgezeichnet war, eingetreten war, ehe der Beobachter es bemerkte, ist auch oft vorgekommen, aber dann jedesmal die Zeit als zweifelhaft angegeben, und solche Beobachtungen sind dann nicht berücksichtigt worden. Der wahrscheinliche Fehler für die reinen Cometensucherzonen ergiebt sich aus der Summe der Fehler 0".963 und 0'.398, aus der Summe ihrer Quadrate 1".002 und 0'.414. Für die gemischten Zonen werden die Zahlen resp. 0".476 und 0'.158 und 0".484 und 0'.171, alle zusammen geben aus der Summe der Quadrate 0".921 und 0'.379. Die Erscheinung, dass die aus den Summen der Fehler selbst geschlossenen wahrscheinlichen Fehler kleiner ausfallen, als die aus den Quadratsummen derselben abgeleiteten zeigt sich also auch hier, und hat sicher ihren Grund in den im 4ten Bande entwickelten Gründen.

Aus 75° sind 332 Sterne verglichen worden, alle aus solchen Gegenden, in denen keine Revisionszonen beobachtet sind. Die Correction der AR. im Mittel findet sich +0".23; sie ist allein eine Folge des Vorherrschens der grossen positiven Correctionen, indem die Corr. 6" nur einmal auf der negativen, fünfmal auf der positiven Seite vorkommt, die von 7" ebenfalls nur einmal negativ, dreimal positiv angetroffen wird, und über 7" nur positive Correctionen, 5 an der Zahl, sich ergeben haben. Für Declination ist die mittlere Correction nur +0'.05, also verschwindend. Die wahrscheinlichen Fehler einer Bestimmung in AR. und Decl. ergeben sich aus den Summen der Fehler selbst resp. 1".614 und 0'.419, aus den Summen der Quadrate 1".762 und 0'.417, also für AR. wieder dieselbe Erscheinung; in Decl. zeigt sie sich nicht, und derjenige Fehler in dieser, der eine gleiche Zahl grös-

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*) Vergl. Bd. 4. Einleitung §. 2. Bei dieser Gelegenheit bemerke ich, dass das am angeführten Orte über den Unterschied zwischen den Cometensucher- und Revisionszonen Bemerkte unrichtig und zu streichen ist. Es sind nämlich die Positionen nicht so angenommen, wie sie im Mittel aus allen Beobachtungen im Cataloge aufgeführt sind, sondern so wie sie die Cometensucherzonen allein gegeben haben würden, wahrscheinlich in der Absicht, dadurch eine grössere Uebereinstimmung in den Resultaten hervorzurufen. Bei der viel später ausgeführten endlichen Redaction muss mir dieser Umstand aus dem Gedächtniss entschwunden sein. In dem Endresultate wird dadurch keine andre Aenderung bewirkt, als dass es für Positionen gilt, die allein aus Cometensucherzonen geschlossen sind.

serer von einer gleichen kleinerer trennt 0'.44 ist sogar noch etwas grösser als die auf die andern Arten entwickelten.

Aehnliche Resultate geben auch die 331 Sterne aus der Zone 76°: Die mittlere Correction in AR. beträgt +0".94. Sie ist zum Theil wieder eine Folge der vorherrschenden grossen positiven Correctionen, indem die von 6" und 7" nur je einmal auf der negativen Seite vorkommen gegen resp. 5 und 3 positive, und die 12 über 7" hinausgehenden sämmtlich positiv sind. Dies erklärt aber noch nicht die Hälfte der starken mittlern Correction, der Rest entsteht durch das durchgängige Vorherrschen des positiven Zeichens in den Correctionen; es sind deren überhaupt nur 97 negative gegen 172 positive. Die Erklärung hierfür ist wohl darin zu suchen, dass die Berechner wahrscheinlich meistens helle Sterne zur Bestimmung der Nullpuncte gewählt haben, die wegen ihrer Helligkeit länger sichtbar blieben, und dadurch den Nullpunct so weit verschoben, dass nun die schwächeren früher verschwindenden Sterne eine positive Correction erforderten. Für Decl. ist der mittlere Unterschied auch hier verschwindend, nämlich nur +0'.03. Die wahrscheinlichen Fehler erhält man aus der Summe der Fehler selbst 1".92 und 0'.436, aus der Summe ihrer Quadrate wieder grösser, nämlich 2".11 und 0'.450. Hierbei ist auf die constante Corr. der AR. keine Rücksicht genommen; wollte man sie in Betracht ziehn, so würde der MF. natürlich etwas kleiner ausfallen, aber doch nur sehr unbedeutend, nämlich nach den beiden Methoden resp. 1".88 und 2".01.

Nehme ich nun die sämmtlichen aus den verschiedenen Abtheilungen untersuchten 3164 Sterne, die bloss auf Cometensucherzonen beruhn, zusammen, so folgt aus der Quadratsumme ihrer Fehler in Declination 1260.62 der mittlere Fehler = 0'.631 und der wahrscheinliche = 0'.426. Die Fehler in AR. wachsen, wie es natürlich ist, mit der Declination; wir haben sie, wieder nur aus den Cometensucherzonen, erhalten:

Für	Decl. =	1°	0".701	aus	903	Sternen	(Bd. III. p. XXIII.)
„	„	13	0.640	„	280	„	(Bd. IV. §. 2.)
„	„	37.5	0.748	„	662	„	(ib. ib.)
„	„	60.5	1.002	„	656	„	(oben.)
„	„	75.5	1.762	„	332	„	(oben.)
„	„	76.5	2.106	„	331	„	(oben.)

Sie lassen sich mit ganz befriedigender Uebereinstimmung durch die Formel

$$\varepsilon'' = \sqrt{\{0.2092 + 0.2076 \operatorname{Sec} \delta^2\}}$$

ausdrücken, statt deren man aber eben so sicher auch die einfachere

$$0''.46\sqrt{1 + \operatorname{Sec} \delta^2}$$

anwenden kann. Für $\delta = 81°$, die grösste Declination, die in unsrer Durchmusterung vorkommt, wird hieraus $\varepsilon'' = 2''.98$.

5.

So wie ich im vorigen Bande ein Verzeichniss der in den Bessel'schen Zonenbeobachtungen aufgefundenen Fehler gegeben habe, so füge ich dem gegenwärtigen ein gleiches für die Bonner nördlichen Zonenbeobachtungen bei. Im Allgemeinen wurden bei Aufstellung desselben dieselben Principien befolgt, die bei der Bearbeitung des Bessel'schen Fehlerverzeichnisses die leitenden waren, und im vorigen Bande in der Einleitung §. 4 angegeben sind. Nur bin ich bei dem gegenwärtigen Verzeichnisse bei den verdächtigen Beobachtungen sorgfältiger gewesen, weil mir die Gelegenheit, in jedem Falle die Originale einzusehn die Möglichkeit dazu gewährte, und ich mich verpflichtet halte,

diese Zonen durch Verbesserung ihrer Fehler so brauchbar wie möglich zu machen. Desshalb habe ich ausser den gröbern Fehlern in den Fadenintervallen, in den Minuten oder Zehnern der Secunde in AR., so wie in den Strichen oder den Zeichen für die Ablesung des Microscops für die Declination, welche die Vergleichung mit den Positionen der Durchmusterung unmittelbar entdecken, und denjenigen kleinern, besonders von einer Umdrehung der Schraube des Microscops, welche die gefundene Abweichung von andern Catalogen vermuthen liess, gesucht, auch den geringen Fehlern möglichst nachzuspüren, und zwar hauptsächlich nach zwei Richtungen. Erstens habe ich alle die Sterne, bei denen die Zeitsecunde als zweifelhaft angegeben war, am hiesigen Meridiankreise neu untersucht, und ebenso wenn das Original angab, dass bei einem Sterne ein Fehler von einer Zeitsecunde entdeckt ward, die vorhergehenden Sterne von demjenigen an, bei welchem zuletzt nach der Uhr gesehn war, entweder alle, oder so viele von Neuem beobachtet, dass dadurch entschieden werden konnte, wo der Fehler begangen worden war. Wo aber das Original keine Veranlassung gab, einen Fehler in der Secunde zu vermuthen, habe ich, auch wenn andre Beobachtungen übereinstimmend eine solche Correction zu fordern scheinen, dieselbe nicht angebracht; es können ja verschiedene Ursachen zusammen gewirkt haben, um einen so grossen Unterschied selbst in nicht sehr hohen Declinationen zu bewirken, schlechte Beobachtung, Fehler in den Reductionselementen, Fehler in den andern Beobachtungen, kleine eigene Bewegung. In solchen Fällen habe ich es für räthlicher gehalten, dem Astronomen, der eine solche Position benutzen will, es zu überlassen, ob er nach sorgfältiger Discussion aller Beobachtungen einen Fehler von einer Secunde annehmen oder die Position ganz unberücksichtigt lassen wolle. Wenn aber bei mehreren auf einander folgenden Sternen der gleiche Unterschied mit andern Beobachtungen sich zeigte, lässt sich mit so grosser Wahrscheinlichkeit vermuthen, es sei hier ein Verzählungsfehler unbemerkt vorgefallen, dass ich keinen Anstand genommen habe, ihn zu corrigiren, dies aber jedes Mal in den Noten bemerkt. In der Zone 108 sind, wie schon am Ende derselben bemerkt ist, so viele Verzählungen vorgefallen, dass ich alle Sterne, für welche sich nicht aus andern Beobachtungen ein Criterium ihrer Richtigkeit oder Unrichtigkeit ableiten liess, neu untersucht und hier auch vereinzelte Fehler für wahrscheinlich genug gehalten habe, um sie zu corrigiren; doch habe ich dies jedes Mal in den Noten besonders bemerkt. Zweitens habe ich besonders in den ersten Zonen, bei welchen Henckel das Microscop abgelesen hatte, weil in diesen so viele Versehen von einer Revolution der Schraube vorgefallen waren, mein Augenmerk auf diese Fehler gerichtet. Desshalb sind sämmtliche Sterne aus den Zonen 106 und 107, deren Declinationen nicht durch die Wiederholungszonen oder durch andere Cataloge genau ermittelt werden konnten, durch Meridianbeobachtungen neu bestimmt, und danach im Fehlerverzeichniss die Declinationen auf Zehntelminuten angesetzt, so wie die durch die Aenderungen der Declinationen nöthig gewordenen Verbesserungen der Durchgangszeiten hinzugefügt. Eine gleiche neue Bestimmung haben alle Sterne aus den Zonen 108 und 113 erfahren, deren Declinationen nicht durch andre Beobachtungen als richtig constatirt waren, und wo sich Fehler vorfanden, habe ich diese angegeben. Auf Sterne aus andern Zonen habe ich eine solche Untersuchung nur in einigen Fällen ausgedehnt, wo eine besonders starke Abweichung der Durchmusterung in der Declination einen Fehler in derselben vermuthen liess. Einen Fehler dieser Art, der nach dem Drucke des Verzeichnisses erst aufgefunden worden ist, füge ich hier nachträglich bei. Er betrifft den Stern Oeltzen Nro. 6864 = Z. 170 Nro. 111, bei dem die neue Beobachtung einen Fehler von —1^{R} hat erkennen lasse Ablesung des Microscops ist demnach bei diesem Sterne zu lesen 44 —0.994, die Corr. —0".8, 76° 28′ 27".8, und demgemäss muss auch die Durchgangszeit in 6^{u} 16′ 31".13 geändert werden.

Ein grosser Theil der in dem Verzeichniss enthaltenen Fehler ist eine einfache Wiederh im 1ten Bande der Bonner Beobachtungen p. 494—496 angeführten, viele sind schon von and nomen aufgefunden, besonders von zwei Herren, nämlich von Oeltzen bei seinen schätzbaren Verg

der verschiedenen Cataloge über den nördlichen Sternhimmel, und von Dr. Hencke, welcher letztere die grosse Gefälligkeit gehabt hat, mir ein sehr reichhaltiges Fehlerverzeichniss mitzutheilen. Ich habe aber keine dieser Correctionen aufgenommen, wenn sie nicht, sobald sie gröbere Fehler betrafen, durch die Durchmusterung, wenn kleinere, durch die letztgenannte Arbeit nicht zu entscheidende, durch wiederholte Vergleichung der Cataloge oder durch neue Beobachtungen am hiesigen Meridiankreise bestätigt wurden. Man kann in solchen Fällen nicht sorgfältig genug sein, und der Erfolg hat meine Vorsicht in nicht wenigen Fällen als nöthig erkennen lassen. Da der unsichere Stand des Wiener Meridiankreises die Anstellung von absoluten Beobachtungen zumal so nördlicher Sterne precair machte, so hat Herr Oeltzen wahrscheinlich Differenzialbeobachtungen angestellt, und sich dabei wohl anderer Sterne meiner Zonen als Vergleichungspuncte bedient, die nun aber unglücklicherweise hin und wieder selbst fehlerhaft waren. Herrn Dr. Hencke aber stand zu seinen Untersuchungen kein anderes Instrument zu Gebote, als ein gewöhnlicher Cometensucher. Dass er dennoch so viele, selbst kleinere, Unrichtigkeiten richtig erkannt hat, zeugt für sein ausserordentlich scharfes Augenmass und die grosse Sorgfalt, die er diesen Untersuchungen zugewandt hat, unschätzbare Eigenschaften, von denen schon seine Bearbeitung der Hora XX für die Berliner academischen Sterncharten einen so glänzenden Beweis geliefert hatte. Aber auch selbst das vortrefflichste Augenmass musste ihn namentlich in sternarmen Gegenden häufig im Stiche lassen, zumal ihm alle Mittel fehlten, durch genauere Bestimmung zu ermitteln, ob ein Stern, mit dem er einen am Himmel vermissten identificirt hatte, auch genau mit der nach seinem Vorschlage corrigirten Position der Zonen übereinstimmte.

Die Anordnung des Verzeichnisses ist nun die folgende: Es enthält in der ersten Spalte die Nummer der Zone; die folgenden 7 entsprechen den gleichen in den gedruckten Zonen, nur dass die in diesen den Grössen gewidmete Spalte hier fehlt. Sie geben in denjenigen Spalten, in denen eine Berichtigung nöthig war, die richtigen Zahlen, während die, in welchen nichts zu ändern ist, unausgefüllt geblieben sind. Eine Ausnahme von der letztern Regel machen nur die Fälle, wo gegen die Zahl des Textes in den Anmerkungen Zweifel erhoben worden waren, die sich später als unbegründet erwiesen haben. Die 9te Spalte enthält die Nummern, unter welchen die einzelnen Sterne in dem bekannten Oeltzen'schen Cataloge vorkommen. Wenn in dieser Spalte keine Zahl angegeben ist, so deutet dies an, dass die betreffende Position im Oeltzen'schen Cataloge keiner Verbesserung bedarf. Es ist dies bei allen den Sternen der Fall, auf welche das Fehlerverzeichniss im 1ten Bande der Bonner Beobachtungen sich erstreckt, so wie bei einigen andern, wo Herr Oeltzen entweder aus andern Quellen oder durch eigene Beobachtungen die nöthigen Verbesserungen schon erkannt hatte, dann bei einer Partie, für welche ich ihm solche nach Einsicht des Originals mitgetheilt hatte, endlich überall da, wo das gegenwärtige Verzeichniss eine früher angezweifelte, aber der Oeltzen'schen Position ungeändert zu Grunde gelegte Zahl wiederholt und dadurch als richtig und zweifellos zu erkennen giebt.

Die letzte Spalte endlich giebt Bemerkungen über die Natur der vorgefallenen Fehler; wo in derselben sich keine Bemerkungen vorfinden, sind die Fehler gewöhnliche Beobachtungsfehler. Die Fälle aber, in denen complicirtere Beobachtungs- oder Reductionsfehler erkannt wurden, sind in den am Schlusse des Verzeichnisses gegebenen Noten genauer discutirt, und ist auf diese durch fortlaufende Zahlen hingewiesen. Der Ausdruck Bemerkung recht bedeutet, dass der in der letzten Spalte des Druckes ausgesprochene Zweifel begründet, Bemerkung verfällt, dass die darin angezweifelte Zahl richtig, endlich Bemerkung falsch, dass die dort gemachte Correctur falsch ist.

Im zweiten Theile des Verzeichnisses „Verbesserungen und Zusätze in Spalte 8" sind die im ersten Bande pag. 497—499 unter gleicher Ueberschrift enthaltenen Bemerkungen nicht wiederholt, sondern nur die neuerdings als nöthig erkannten Zusätze und Verbesserungen angezeigt worden.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
1.	32	5	14 39 35.32	+ 30	—	+ 7.5	51 17 12.7	14827	
	33	—	41 28.70	—	—	—	—	14846	Bemerkung recht.
	46	3	55 29.50	—	—	+ 3.2	52 30 33.5	15021	
	47	—	56 34.76	—	63 1.350	+ 9.3	51 26 6.1	15032	
	77	—	—	—	46 1.190	—	52 51 5.8	15466	Druckfehler.
	88	—	15 43 6.06	—	—	—	—	15630	Abschreibefehler.
	91	—	47 10.33	—	—	—	52 15 0.5	15699	Reductionsfehler.
2.	6	—	14 34 55.83	—	—	—	—	14765	1.
	7	—	35 50.16	—	—	—	—	14781	
	20	—	48 21.63	—	—	—	—	14939	Bemerkung recht.
	67	3.5	15 38 10.98	+ 30	—	+ 4.0	49 56 59.3	15587	
	68	f	37 41.48	+ 89	—	— 1.2	50 42 51.7	15582	
	69	3	40 4.30	—	—	+ 2.8	50 58 39.3	15609	
	70	3	41 0.70	—	—	+13.6	49 31 22.3	15622	
	71	5	42 14.40	+ 30	—	+ 1.7	51 10 2.3	15637	
	72	5	43 3.52	+ 30	—	+ 2.8	51 17 34.9	15645	
	73	5	43 55.44	+ 30	—	+ 2.1	50 47 50.3	15661	
	74	d	44 1.44	+ 59	—	+ 0.9	50 22 22.2	15663	
	75	d	44 35.69	+ 60	—	— 0.3	50 29 35.2	15669	
	76	d.f	45 7.38	+ 70	—	+ 1.3	50 18 46.9	15679	
	77	5.d	46 55.22	+ 29	—	+ 5.1	49 43 47.0	15701	
	79	5	49 28.97	+ 30	—	+ 1.1	50 53 48.6	15729	
	80	1.3	51 33.88	— 15	—	+ 4.6	50 19 26.5	15760	
	81	f	50 59.96	+ 89	—	— 2.0	50 24 31.1	15765	
3.	10	f	13 37 47.27	+ 91	—	— 2.2	50 49 39.2	—	Bemerkung recht.
	31	—	14 10 42.75	—	—	—	—	14422	Druckfehler.
	43	—	—	—	—	—	48 41 46.5	—	Druckfehler.
	52	1	33 1.68	—31	—	—	—	14740	
4.	1	—	14 59 42.54	—	—	—	—	—	
	3	—	15 4 30.26	—	—	—	—	—	
	28	—	—	—	—	—	49 20 31.1	15505	Druckfehler.
	35	—	41 19.04	—	—	—	—	15621	
	65	3	16 15 36.00	—	—	+ 8.9	47 2 45.7	16103	2.
	66	d	17 33.60	+ 55	—	+ 6.3	47 4 43.0	16135	2.
	67	3.5	20 5.37	+ 14	—	+ 9.1	47 12 0.4	16170	2.
	68	d.f	20 23.36	+ 58	—	+ 6.5	47 15 51.8	16174	2.
5.	10	—	—	—	—	—	54 37 32.1	14504	Reductionsfehler.
	23	—	14 31 25.46	—	—	—	—	14724	
	26	—	—	—	—	—	54 42 47.0	—	Druckfehler.
	27	—	34 59.48	—	—	—	—	14756	Bemerkung recht.
	33	—	14 39 48.36	—	62 4.010	+ 7.5	54 28 9.8	14815	
	56	—	—	—	—	—	56 37 21.9	—	Druckfehler.
	70	—	15 23 49.39	—	50 6.090	+ 3.3	55 26 28.2	15392	
6.	2	—	16 4 43.86	—	—	—	—	—	
	4	—	6 14.55	+ 60	—	— 1.3	51 9 5.9	15966	Reductionsfehler. Bemerk. verfällt.
	26	3.4	30 10.26	—	—	—	—	—	
	32	2	37 21.89	— 16	—	+ 2.2	51 1 35.2	16434	
7.	6	4	14 27 57.48	+ 19	—	+ 0.8	59 19 13.9	14653	
	9	3.4	33 17.23	—	—	—	—	14737	
	26	—	—	—	42 —0.090	+ 0.9	59 9 45.1	—	
8.	5	—	16 0 17.78	—	—	—	—	15879	Reductionsfehler.
	6	—	0 58.83	—	—	—	—	15889	Reductionsfehler.
9.	17	—	15 59 41.50	—	—	—	—	15881	
	18	—	—	—	—	—	54 51 10.0	15894	Reductionsfehler.
	19	—	—	—	—	—	54 50 58.1	15904	Reductionsfehler
	26	—	—	— 23	—	+ 6.1	54 45 27.0	—	Reduction
	30	—	16 24 10.84	—	—	—	54 52 34.6	16244	Reductio
10.	5	—	17 41 31.58	—	—	—	—	17491	
	32	—	—	+ 39	—	—	—	—	Druckf
	36	e	18 17 20.87	+ 73	—	+10.4	49 27 33.0	18169	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			h ′ ″	″		″	° ′ ″		
10.	39	4	18 21 13.38	—	—	—	—	18243	
	43	—	—	+ 37	—	—	—	—	Druckfehler.
	45	3.4	25 59.74	+ 12	—	+11.1	48 29 49.8	18328	
	46	—	27 51.78	—	—	—	—	—	Reductionsfehler.
11.	1	—	—	+ 87	—	+ 2.7	58 29 47.7	—	Reductionsfehler.
	25	1	15 55 8.37	— 36	—	+ 9.9	57 50 19.8	15808	
	35	—	16 2 27.09	+ 78	—	+ 8.5	57 6 32.4	15914	Reductionsfehler.
	48	—	15 13.67	+ 85	—	+11.0	58 0 59.3	16112	Reductionsfehler.
	67	—	—	— 26	—	+ 9.1	57 36 52.8	16455	Reductionsfehler.
13.	1	—	15 59 38.35	—	—	—	—	—	3.
	6	—	16 6 33.11	— 29	—	—	55 4 18.6	15991	Reductionsfehler.
	41	3.4	37 42.74	—	—	—	—	16460	
	55	—	—	+102	—	+10.7	55 0 26.9	—	Reductionsfehler.
	73	—	—	— 37	—	+ 8.4	54 18 19.0	—	Reductionsfehler.
	76	—	17 10 22.45	+ 94	—	+ 1.0	55 39 21.4	16970	Reductionsfehler.
	81	5	16 30.50	+ 46	—	+ 0.8	56 20 25.0	17071	
	96	—	—	— 25	—	+ 1.0	55 49 54.5	—	Reductionsfehler.
	102	—	—	— 31	—	+ 0.3	56 15 40.2	—	Reductionsfehler.
	109	—	46 46.92	—	—	—	—	17580	Bemerkung verfällt.
14.	7	—	—	+ 41	—	—	—	—	Druckfehler.
	26	—	19 16 24.53	—	—	—	—	—	Bemerkung verfällt.
	34	—	—	+ 78	—	+ 1.9	52 50 24.6	—	Reductionsfehler.
	81	—	—	—	—	—	53 57 13.6	19811	Druckfehler.
	84	—	54 4.07	—	—	—	—	19862	4.
	89	—	—	+ 34	—	—	—	—	Reductionsfehler.
	104	—	20 4 26.20	+ 99	—	+ 2.3	52 28 20.3	20126	5.
	115	—	—	— 24	—	+ 2.7	54 3 7.6	—	Reductionsfehler.
	125	—	20 10.92	—	—	—	—	—	6.
	135	—	24 53.12	—	—	—	—	20641	
15.	2	—	—	+ 39	—	— 4.1	49 1 33.3	—	Reductionsfehler.
	11	—	—	—	—	—	49 28 34.0	17008	Druckfehler.
	12	—	—	—	—	—	49 27 5.8	17032	Druckfehler.
	50	—	17 47 51.16	+ 48	—	+ 5.7	46 41 0.2	17599	Reductionsfehler.
	66	—	18 0 22.46	+ 44	—	— 0.2	48 12 59.3	17813	
	68	—	—	+100	—	— 2.2	48 9 52.0	—	Reductionsfehler.
16.	8	—	19 6 24.51	—	—	—	55 38 6.5	—	Reductionsfehler.
	9	—	6 8.58	—	—	—	55 26 4.7	—	Reductionsfehler.
	30	—	—	—	—	—	55 22 32.8	19243	Reductionsfehler.
	32	—	19 19.85	—	—	—	—	—	Reductionsfehler.
17.	20	—	17 56 1.28	+ 38	—	—	—	—	Reductionsfehler.
	33	—	18 5 43.00	+ 49	—	+10.7	51 50 45.5	17945	7.
	34	—	6 20.57	+ 55	—	+11.3	51 52 10.9	17959	7.
19.	2	—	—	—	—	—	48 56 0.3	20405	Reductionsfehler.
	5	—	20 17 59.08	— 11	—	+ 0.8	48 18 33.8	—	Reductionsfehler.
	37	—	—	+ 39	—	+ 9.0	47 1 16.0	—	Reductionsfehler.
	42	5	36 58.77	+ 24	—	+10.2	46 50 24.0	20972	
	44	—	—	— 36	—	+ 6.6	46 43 44.0	—	Reductionsfehler.
	46	2	39 55.49	— 15	—	+ 8.3	46 57 5.7	21048	
	53	—	42 47.23	+ 31	—	—	—	21131	Reductionsfehler.
	60	—	—	+ 12	—	+ 8.8	47 0 20.9	—	Reductionsfehler.
	61	—	—	+ 8	—	+11.0	47 17 40.4	—	Reductionsfehler.
	62	—	—	+ 8	—	+11.3	47 20 45.1	—	Reductionsfehler.
	71	—	—	— 58	—	+ 6.5	47 0 39.2	—	Reductionsfehler.
	85	—	—	— 16	—	+10.7	47 14 40.7	—	Reductionsfehler.
	87	—	—	—	—	+12.2	47 24 59.5	—	Reductionsfehler.
	167	—	21 52 47.31	+ 24	—	—	—	—	Druckfehler und Reductionsfehler.
	168	—	—	— 40	—	—	—	—	Reductionsfehler.
	169	—	—	+ 24	—	+ 4.1	47 31 37.6	—	Reductionsfehler.
	174	—	56 57.85	—	—	—	—	—	Bemerkung verfällt.
	175	—	56 52.49	—	—	—	—	—	Bemerkung recht.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
20.	31	—	18 35 42.69	—	—	—	—	18516	Reductionsfehler. Bemerk. verfällt.
	41	—	43 8.35	+ 69	53 4.915	+ 3.3	58 10 34.8	—	Reductionsfehler und Druckfehler.
	82	—	19 15 20.89	— 36	—	+ 7.7	56 43 24.9	—	Reductionsfehler.
21.	19	—	18 43 43.60	—	—	—	—	—	Bemerkung verfällt.
	33	—	54 30.32	—	—	—	49 6 20.0	18820	Reductionsfehler.
	34	—	—	—	—	—	49 17 37.9	18824	Reductionsfehler.
	35	—	54 45.81	—	—	—	49 22 35.5	18825	Reductionsfehler.
	36	—	55 53.59	—	—	—	50 18 54.0	—	Reductionsfehler.
	37	—	57 9.08	—	—	—	49 29 15.3	18857	Reductionsfehler.
	38	—	57 35.08	—	—	—	49 24 53.1	18864	Reductionsfehler.
	39	—	—	—	—	—	49 22 7.7	18883	Reductionsfehler.
	46	—	19 2 29.02	—	—	—	—	18961	Bemerkung verfällt.
	47	—	3 15.80	—	—	—	—	18975	Bemerkung verfällt.
	59	b	12 10.87	— 74	—	+ 5.6	48 49 55.4	—	Bemerkung recht.
	65	—	—	—	—	—	48 55 46.4	19152	Druckfehler.
	68	—	—	—	—	—	49 8.7	19186	8.
	115	—	53 11.11	—	—	—	—	—	Druckfehler.
	126	—	20 0 29.58	—	—	—	50 0 2.5	20005	Reductionsfehler.
	127	—	19 59 27.02	—	—	—	48 52 32.6	19987	Reductionsfehler.
	128	—	—	—	—	—	48 43 48.6	—	Reductionsfehler.
	129	—	—	—	—	—	48 38 9.9	—	Reductionsfehler.
22.	61	—	21 40 11.10	—	—	—	—	—	
	62	—	40 57.83	—	—	—	—	—	
23.	19	—	18 16 24.40	—	—	—	—	—	Bemerkung recht.
	43	—	—	+ 18	—	+ 2.2	47 1 23.9	—	Reductionsfehler.
	47	—	35 34.28	—	—	—	—	—	Bemerkung recht.
	54	—	39 46.37	—	—	—	—	—	Bemerkung recht.
	60	—	—	—	—	—	45 5 0.2	18653	Reductionsfehler.
	77	—	—	— 49	—	+ 9.3	45 22 47.9	—	Reductionsfehler.
	105	—	—	—	—	—	46 53 39.8	19216	Reductionsfehler.
	119	—	—	—	—	—	45 42 59.6	—	Druckfehler.
	137	—	19 36 8.58	+ 45	—	—	—	19539	Reductionsfehler.
	164	—	—	—	—	—	46 10 19.8	19881	Druckfehler.
24.	31	—	21 23 48.54	—	—	—	—	—	Reductionsfehler.
	41	4	31 20.22	+ 29	—	+ 2.2	64 52 45.4	22554	
	60	—	50 57.31	—	—	—	—	—	Bemerkung verfällt.
	61	—	51 39.00	—	—	—	—	—	Bemerkung verfällt.
	109	—	—	—	—	—	—	24340	Grösse 8.9 Druckfehler.
25.	5	—	—	—	—	—	64 0 39.0	—	Druckfehler.
	6	—	18 5 31.50	— 53	—	+ 2.1	64 11 46.6	17946	Reductionsfehler.
	15	—	11 50.65	+ 41	—	—	—	—	Reductionsfehler.
	23	—	19 7.39	—	—	—	—	18209	Bemerkunng recht.
	36	—	—	—	—	—	64 56 18.4	18505	Druckfehler.
	63	—	—	—	—	—	64 32 51.0	19009	Druckfehler.
26.	60	—	—	— 4	—	+ 1.4	53 37 12.5	—	Reductionsfehler.
	81	—	21 31 25.58	—	—	—	—	—	Bemerkung verfällt.
	92	—	—	— 18	—	—	—	—	Druckfehler.
	119	—	54 1.71	—	—	—	—	23218	9.
	121	—	54 55.02	+ 27	38 5.650	+ 2.4	53 24 8.8	23243	
	129	—	—	—	—	—	52 51 24.5	23386	Druckfehler.
27.	24	d	20 11 4.13	—	—	—	—	—	Bemerkung verfällt.
	32	—	—	— 47	—	+ 9.6	45 17 31.0	—	
	55	—	—	+ 33	—	—	—	—	Reductionsfehler.
	66	—	36 36.65	—	—	—	—	—	Druckfehler.
	88	—	—	—	—	—	44 33 36.2	21279	Druckfehler.
	112	—	—	+ 15	—	—	—	—	Reductionsfehler.
	143	—	21 16 48.63	—	—	—	—	—	Bemerkung verfällt.
	157	—	—	—	—	—	45 44 6.6	—	Bemerkung verfällt.
	174	—	33 42.50	—	—	+ 3.6	45 33 24.4	22649	Bemerkung recht.
	226	—	—	— 4	—	+ 1.4	47 3 9.0	—	Reductionsfehler.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
28.	15	—	—	— 30	—	+ 9.7	47 19 30.8	—	Reductionsfehler.
	24	—	18 34 5.28	—	—	—	48 52 25.2	—	Reductionsfehler.
	31	—	—	+ 34	—	—	—	—	Druckfehler.
	45	—	51 23.51	—	—	—	—	18786	
	67	—	19 7 54.61	—	—	—	—	19056	Bemerkung recht.
	79	—	—	— 49	—	— 0.2	49 8 47.0	—	
29.	20	—	21 16 25.56	— 97	—	+ 6.9	66 6 35.5	22141	Bemerkung recht.
	40	—	—	— 16	—	+10.9	67 20 57.8	—	Reductionsfehler.
	54	—	—	— 14	—	+ 1.9	68 35 16.3	—	Reductionsfehler.
	88	—	22 11 14.39	—	—	—	—	—	Bemerkung verfällt.
30.	7	—	—	— 83	—	+ 0.8	61 23 10.9	—	Reductionsfehler.
	19	—	18 49 4.23	—	—	—	—	18743	Bemerkung verfällt.
	37	—	—	— 14	—	+ 8.4	60 13 25.7	—	Reductionsfehler.
	73	—	19 30 6.45	—	—	—	59 49.2	—	
	116	—	20 3 34.12	— 12	—	+ 1.7	62 36 57.2	—	Reductionsfehler.
	152	—	33 18.68	—	—	—	61 52.8	20868	10.
	153	—	33 42.34	+ 61	45 2.590	+ 1.8	61 53 20.1	20882	10.
	173	—	—	— 13	—	+ 2.3	61 57 42.5	—	Reductionsfehler.
	181	—	—	—	41 1.500	+ 1.6	62 14 11.1	21460	
	193	—	—	+139	—	— 0.4	61 36 42.4	—	Reductionsfehler.
31.	7	—	—	— 16	—	+ 1.7	72 7 53.6	—	Reductionsfehler.
	21	—	—	— 16	—	+ 9.2	70 47 16.8	—	Reductionsfehler.
	31	—	18 54 52.18	+ 95	—	+ 2.5	71 34 40.6	18829	Reductionsfehler.
	54	—	—	+127	—	— 0.6	73 59 53.8	—	Reductionsfehler.
	66	—	—	+ 9	—	+ 9.8	69 54 14.2	—	Reductionsfehler.
	84	—	—	—171	—	+ 5.9	71 27 16.3	—	Reductionsfehler.
32.	1	f	20 58 0.85	+157	—	+ 7.7	70 20 40.2	—	Bemerkung recht.
	3	—	—	— 94	—	+ 6.2	70 35 15.1	—	Reductionsfehler.
	9	—	21 8 25.20	—	—	—	—	21882	11.
	28	—	29 30.71	—	—	—	—	—	Bemerkung verfällt.
33.	3	—	—	—	—	—	50 0 4.1	—	Druckfehler.
	25	—	—	+ 79	—	+ 0.7	50 23 10.1	—	Reductionsfehler.
	100	—	—	—	—	+ 7.9	48 40 56.8	21853	Reductionsfehler.
	101	2	21 7 7.14	— 9	—	+ 8.8	48 46 54.9	21872	
	110	—	12 14.97	+ 92	—	+ 0.1	51 24 27.6	22007	Reductionsfehler.
	136	—	—	—	—	+ 3.7	49 49 23.7	—	Reductionsfehler.
	137	—	—	—	—	+ 4.0	49 49 32.7	—	Reductionsfehler.
	142	—	—	—	—	—	48 58 10.8	22664	Druckfehler.
	164	—	—	+ 87	—	+ 4.7	49 34 3.3	—	Reductionsfehler.
	167	—	—	—	52 4.955	+ 3.1	49 44 24.9	23124	
34.	4	—	—	— 84	—	+ 9.3	75 26 48.0	—	Reductionsfehler.
	21	—	18 58 28.88	—	—	—	—	18873	Bemerkung recht.
	22	—	58 27.58	—	—	—	—	18870	Bemerkung recht.
	33	—	—	—149	—	— 3.5	79 35 27.0	—	Reductionsfehler.
	36	—	—	— 53	—	+ 8.5	76 9 54.0	—	Reductionsfehler.
	40	—	19 27 15.71	—	—	—	—	19326	
	61	2	50 54.71	—128	—	+ 5.4	73 56 19.1	19816	
	66	—	—	— 88	—	+ 6.4	75 9 3.9	—	Reductionsfehler.
	99	—	20 34 19.18	—	—	—	—	—	Reductionsfehler.
	102	—	—	+361	—	—	—	—	Druckfehler.
36.	4	—	19 29 50.15	—	—	—	—	—	Bemerkung verfällt.
	10	e	35 38.60	+105	—	+ 8.6	63 39 22.6	19524	
	34	—	—	— 51	—	+ 8.5	63 23 25.1	—	Reductionsfehler.
	77	d	20 32 59.12	+ 76	—	+ 7.5	63 43 5.6	20881	
	82	—	35 22.80	+ 86	—	+ 8.7	63 25 40.4	20926	Reductionsfehler.
	84	—	37 14.53	—	—	—	—	—	Bemerkung verfällt.
	98	—	—	+126	—	+ 0.1	64 53 9.0	—	Reductionsfehler.
37.	5	—	—	—	—	—	51 3 54.7	—	Druckfehler.
	7	—	—	—	36 3.270	—	—	—	Druckfehler.
	11	—	—	—	41 5.205	—	—	—	Druckfehler.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
37.	39	—	—	+ 38	—	+ 2.9	50 56 11.6	—	Reductionsfehler.
	75	—	23 1 40.12	—	—	—	—	25192	12.
	113	—	33 20.81	—	—	—	—	—	Druckfehler.
38.	10	—	—	— 45	—	— 0.2	56 35 31.9	—	Reductionsfehler.
	17	—	—	—	—	—	56 43 24.6	—	Reductionsfehler.
	36	—	19 30 16.06	—	—	—	—	—	Reductionsfehler.
	39	—	—	—	70 2.620	—	53 49 7.6	19505	13.
	80	e	—	—	—	—	—	—	Bemerkung verfällt.
	91	—	—	—	65 0.470	—	—	—	Druckfehler.
	92	—	—	—	—	—	54 0 15.4	—	Reductionsfehler.
9.	56	—	22 35 31.28	+ 45	—	+ 2.4	53 5 8.4	24546	Reductionsfehler.
	95	—	—	—	—	+ 3.1	52 15 50.4	25292	Reductionsfehler.
	128	—	23 28 23.47	—	—	—	—	—	Bemerkung recht.
0.	57	4	20 42 47.71	+ 22	—	—	—	—	
	73	—	53 20.45	—	—	—	—	—	Bemerkung recht.
41.	21	—	22 43 0.99	—	—	—	—	—	Bemerkung verfällt.
	30	—	50 40.97	+ 71	—	+ 1.4	65 39 6.1	24960	14.
	43	—	23 3 34.91	—	—	—	—	25242	Bemerkung recht.
	64	—	—	— 14	—	+ 2.3	64 56 57.2	—	Reductionsfehler.
	92	—	42 55.47	—	—	—	—	—	Reductionsfehler
	97	—	—	—	—	—	64 54 2.9	26151	Reductionsfehler.
	98	—	—	—	—	—	65 5 57.3	26223	Reductionsfehler.
	99	—	—	—	—	—	65 57 57.5	26191	Reductionsfehler.
	100	—	—	—	—	—	65 52 1.2	26198	Reductionsfehler.
	111	—	56 21.42	—	—	—	—	—	Druckfehler.
42.	18	—	—	—	—	—	—	—	Grösse 9. 15.
	74	—	—	—	—	—	54 43 42.7	21975	Druckfehler.
	117	—	—	—	—	—	56 35 59.0	22668	Druckfehler.
	127	—	21 41 42.29	—	—	—	—	—	Reductionsfehler.
43.	11	—	23 4 28.20	—	—	—	—	—	Reductionsfehler.
	15	—	4 28.32	—	—	—	—	—	Reductionsfehler.
	70	—	—	—	—	—	56 54 29.6	25977	Druckfehler.
	88	2	47 10.67	— 26	—	—	—	26185	
	94	e	49 12.18	+ 88	—	+ 0.9	59 4 18.0	26224	16.
	110	—	—	+ 97	—	+ 1.1	58 51 53.3	—	Reductionsfehler.
	142	—	0 18 5.65	—	—	—	—	—	Druckfehler.
	144	3.4	18 47.35	+ 3	—	+ 2.1	59 40 56.4	373	Bemerkung falsch.
	150	—	22 14.53	+ 6	—	+ 2.1	59 22 51.9	423	Bemerkung recht.
44.	15	—	22 43 15.75	— 95	—	+ 0.5	67 43 45.5	—	Reductionsfehler.
	34	4.d	23 0 6.49	+ 29	—	+11.0	66 26 37.5	—	
	35	d	0 18.14	—	—	—	—	—	17.
	56	—	—	—	—	—	69 29 11.1	—	Druckfehler.
45.	2	—	20 32 50.73	—	—	—	—	20859	Reductionsfehler.
	44	—	—	+208	—	— 1.5	77 55 49.5	—	Reductionsfehler.
	45	—	—	— 27	—	+10.2	76 24 15.8	—	Reductionsfehler.
	62	—	21 43 34.11	+241	—	— 3.0	77 29 57.9	22946	Reductionsfehler.
	67	—	53 40.76	— 74	—	+ 1.1	79 12 2.6	23206	Reductionsfehler.
	70	—	56 12.40	— 71	—	— 0.1	79 32 56.8	23278	
	73	—	58 54.62	—	—	—	—	23359	18.
	89	—	22 18 2.81	—233	—	— 4.8	79 6 17.7	23995	Reductionsfehler.
	117	—	40 52.77	+203	—	— 1.3	77 40 54.1	24707	Reductionsfehler.
47.	42	—	—	— 24	—	+ 6.4	45 13 54.7	—	Reductionsfehler.
	55	—	—	+ 32	—	—	—	—	Reductionsfehler.
	98	—	22 54 24.16	—	—	—	—	—	Bemerkung recht.
48.	39	—	22 17 12.74	+ 36	—	—	—	24013	Reductionsfehler.
	48	—	22 28.00	—	—	—	—	24173	
	84	—	—	+ 87	—	+ 2.7	55 29 21.5	—	Reductionsfehler.
	88	—	—	0	—	+ 2.8	55 14 39.7	—	Reductionsfehler.
	144	—	23 17 13.17	— 76	—	+ 0.2	55 14 20.2	—	Reductionsfehler. Bemerkung verfällt.
	159	3	23 47.20	—	—	+ 7.9	54 42 50.0	25695	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
48.	174	2	23 32 45.62	— 26	—	+ 1.9	56 26 51.1	25910	
49.	50	—	—	— 94	—	+ 4.1	57 41 35.5	—	Reductionsfehler.
50.	37	—	23 55 58.42	—	—	—	—	—	
	56	—	0 9 10.45	— 27	—	+ 7.9	51 32 27.4	188	Druckfehler. 19.
	72	—	17 17.63	—	—	—	—	346	Bemerkung verfällt.
	121	—	46 54.72	+ 83	—	+ 2.7	52 29 49.3	898	20.
	133	—	—	+102	—	+ 9.2	51 37 6.0	—	Reductionsfehler.
	138	2	59 42.67	— 13	—	+ 2.5	52 0 47.8	1153	
	144	—	—	—	—	—	51 33 41.6	1275	Druckfehler.
	154	2.3	1 12 48.55	—	—	—	—	—	Bemerkung verfällt.
	161	—	16 58.70	—	—	—	—	—	
51.	3	—	—	—	—	—	—	23426	21.
	29	—	—	—	—	—	48 25 8.9	—	Druckfehler.
	34	—	22 16 38.68	+ 63	—	+ 2.5	47 51 8.7	23999	Reductionsfehler.
	54	4	30 45.45	—	—	—	—	—	
	56	—	—	—	—	—	48 16 55.0	—	Druckfehler.
	74	—	—	— 50	—	—	—	—	Druckfehler.
	117	—	—	— 40	—	—	—	—	Druckfehler.
	149	e	23 28 40.33	+ 65	—	+ 3.0	47 42 23.9	25826	
52.	66	—	—	—	—	—	56 58 31.4	1283	Druckfehler.
	98	—	1 22 20.62	—	—	—	59 48 53.8	1635	Reductionsfehler.
	99	—	22 2.53	—	—	—	59 38 3.9	1625	Reductionsfehler.
	126	—	37 19.22	—	—	—	—	—	Bemerkung verfällt.
	133	—	—	— 82	—	+ 5.3	57 11 32.5	—	Reductionsfehler.
	147	—	51 17.22	—	—	—	—	—	Bemerkung verfällt.
	156	—	—	— 89	—	— 0.9	58 11 4.0	—	Reductionsfehler.
	169	—	—	+ 31	—	+ 8.2	57 35 25.7	—	Reductionsfehler.
53.	48	—	—	— 51	—	+ 0.6	62 45 50.2	—	Reductionsfehler.
	66	—	—	+ 47	—	+ 2.2	61 36 10.1	—	Reductionsfehler.
54.	51	—	—	— 30	—	+ 0.8	60 36 50.9	—	Reductionsfehler.
	56	—	23 35 11.96	—	—	—	—	—	22.
	57	—	37 28.37	—	—	—	—	26007	22.
	58	—	36 45.86	—	—	—	—	25997	22.
55.	35	—	1 52 52.03	—	—	—	—	—	Reductionsfehler.
	65	—	2 9 26.35	—	—	—	—	—	Bemerkung recht.
	126	—	48 41.36	—	—	—	—	—	
	127	—	50 43.53	—	—	—	—	3383	
	132	5	55 29.93	+ 33	—	— 1.2	51 34 2.1	—	
	133	—	55 47.95	—	—	—	—	—	
	134	—	56 49.18	—	—	—	—	—	
56.	20	—	23 48 37.44	—	—	—	—	26245	Reductionsfehler.
	26	—	—	—	—	—	49 54 47.9	26270	Reductionsfehler.
	57	—	0 15 5.95	—	—	—	—	316	Bemerkung verfällt.
	64	—	21 32.44	—	—	—	—	446	
	83	—	33 23.69	—	—	—	—	655	Bemerkung recht.
	110	3.4	51 46.69	—	—	—	—	—	Bemerkung verfällt.
	120	—	58 55.08	+ 35	—	— 1.6	49 36 47.3	1133	Schreibfehler.
57.	10	—	2 7 24.61	—	—	—	—	2630	
	26	—	14 41.85	—	—	—	—	2741	Reductionsfehler.
	103	—	3 2 58.95	—	—	—	—	—	Bemerkung verfällt.
	125	—	20 52.58	—	—	—	—	—	Bemerkung verfällt.
	126	—	21 28.21	—	—	—	—	—	Bemerkung verfällt.
	127	—	21 15.11	—	—	—	—	—	Bemerkung verfällt.
	128	—	22 27.35	—	—	—	—	—	Bemerkung verfällt.
	129	—	20 17.62	—	—	—	—	—	Bemerkung verfällt.
	130	—	23 42.30	—	—	—	—	—	Bemerkung verfällt.
	136	—	24 59.51	—	—	—	—	3942	Reductionsfehler.
58.	15	—	23 44 8.47	—	—	—	—	26111	Reductionsfehler.
	16	—	45 9.65	—	—	—	—	26152	Reductionsfehler.
	49	—	0 3 38.44	—	—	—	—	102	Bemerkung recht.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
58.	50	—	0 6 34.88	—	—	—	—	137	
	63	—	15 45.88	—	—	—	48 36 44.7	324	Reductionsfehler.
	64	—	16 22.32	—	—	—	48 35 41.9	340	Reductionsfehler.
	65	—	16 26.77	—	—	—	48 31 0.6	342	Reductionsfehler.
	66	—	—	—	—	—	48 47 3.2	331	Reductionsfehler.
	99	—	38 49.63	—	—	—	—	—	Bemerkung recht.
	108	—	45 30.61	—	—	—	—	—	Druckfehler.
	119	e	52 26.35	+ 64	—	— 1.7	46 51 5.0	—	
59.	61	f	2 36 40.36	+ 89	—	—10.0	62 52 39.0	3190	23.
	86	2	57 9.84	+ 34	—	— 3.0	60 31 8.8	3481	
	94	—	3 4 38.02	—	—	—	—	3606	Reductionsfehler.
60.	84	5	1 7 1.53	+ 43	—	—	—	1342	
	95	4	18 7.05	—	—	—	—	1563	
61.	34	—	2 59 12.92	—	—	—	—	3518	Bemerkung recht.
	68	—	3 19 3.22	—	—	—	—	—	Bemerkung verfällt.
	104	d	45 34.51	—	—	—	—	—	Bemerkung recht.
62.	12	—	—	—	—	—	—	26033	24.
63.	12	—	2 14 27.70	— 59	—	— 4.2	67 56 27.0	2723	Reductionsfehler.
	53	—	47 34.69	— 84	—	—12.3	68 35 34.9	3322	Bemerkung falsch.
64.	41	—	2 59 41.29	—	37 2.465	— 2.8	46 55 31.7	—	Bemerkung recht.
	52	—	3 7 48.52	—	—	—	—	—	Bemerkung recht.
65.	57	—	5 58 15.30	—	—	—	57 2 51.6	6537	Reductionsfehler. 25.
	58	—	6 0 15.45	—	—	—	59 15 40.7	6572	Reductionsfehler. 25.
	59	—	2 18.38	—	—	—	59 15 5.5	6614	Reductionsfehler. 25.
	60	—	1 43.36	—	—	—	60 1 57.2	6602	Reductionsfehler. 25.
	61	—	2 18.31	—	—	—	59 15 3.6	6613	Reductionsfehler. 25.
	62	—	—	—	—	—	58 52 2.6	—	Reductionsfehler.
	63	—	4 50.41	—	—	—	58 46 42.7	6660	Reductionsfehler. 25.
	64	—	4 43.97	—	—	—	58 20 41.9	6653	Reductionsfehler. 25.
	65	—	4 2.37	—	—	—	57 27 29.5	6643	Reductionsfehler. 25.
	66	—	4 59.89	—	—	—	57 29 58.6	6661	Reductionsfehler. 25.
	69	c	10 52.47	— 79	—	—10.4	59 44 21.9	6732	26.
	82	1	19 20.75	— 75	—	— 4.4	57 56 36.7	6927	27.
	83	c.1	19 18.82	— 43	—	— 2.8	57 56 8.1	6929	27.
66.	75	—	3 57 17.00	—	—	—	—	—	Bemerkung recht.
67.	4	5	5 33 12.00	+ 21	—	— 1.2	47 49 54.7	6171	
	10	—	39 24.82	—	—	—	—	6279	28.
68.	74	—	4 40 11.97	—	—	—	—	—	Bemerkung recht.
70.	8	—	—	—	—	—	45 49 18.8	4646	Reductionsfehler.
	9	—	—	—	—	—	45 53 46.6	4661	Reductionsfehler.
	21	—	4 13 37.92	—	—	—	—	4766	Bemerkung recht.
	82	a	57 38.52	— 80	—	— 5.8	46 14 20.5	5488	29.
	125	3.4	5 24 39.61	—	—	—	—	—	Bemerkung verfällt.
71.	76	—	4 28 29.23	—	—	—	—	—	
	77	—	27 56.47	—	—	—	—	—	
	80	—	30 34.14	—	—	—	—	—	Bemerkung recht.
	112	—	—	—	—	—	49 49 28.9	—	Reductionsfehler.
72.	36	5	2 53 54.59	+ 40	—	—	—	3405	Reductionsfehler.
	103	—	3 52 14.62	+ 24	—	—	—	4384	30.
	106	—	53 38.32	—	—	—	—	4405	
73.	34	—	6 3 11.02	+ 76	65 2.020	— 8.7	56 46 15.2	6628	
74.	14	—	3 12 45.93	—	—	—	—	3710	Reductionsfehler.
	26	4	21 38.15	+ 18	—	— 1.3	63 41 28.4	3884	
	27	—	24 28.37	—124	—	— 5.9	63 42 50.8	3910	Reductionsfehler.
	30	—	26 10.11	—	—	—	—	3962	31.
	31	—	26 16.42	—	—	—	—	3964	31.
	78	—	4 2 46.48	— 36	—	— 9.9	65 39 57.3	4581	Reductionsfehler.
	95	—	19 6.08	— 29	47 4.685	— 4.4	64 16 53.4	4861	
	96	—	20 12.02	—	46 1.490	— 2.7	64 9 26.6	4875	
	112	—	—	—	53 1.950	— 3.0	64 44 47.7	5027	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
75.	25	—	2 45 29.12	—	—	—	—	—	Reductionsfehler.
	26	—	49 18.68	+ 49	—	—	—	—	Reductionsfehler.
	32	—	—	—	—	—	50 33 28.9	3458	Druckfehler.
	40	—	3 3 50.79	— 71	—	—10.7	50 55 41.8	3598	Reductionsfehler.
76.	4	4	5 0 51.64	—	—	—	—	—	
	81	—	—	—	—	—	49 29 21.5	6603	Druckfehler.
	113	—	6 30 49.47	— 43	—	— 3.9	49 32 53.0	7140	Reductionsfehler.
77.	20	—	2 52 42.29	—	—	—	—	3376	Reductionsfehler.
	66	—	3 33 28.59	—	—	—	—	—	32.
	67	—	35 24.80	—	—	—	—	—	32.
	70	—	35 32.04	+144	—	— 3.3	70 0 7.0	—	Reductionsfehler.
	123	—	4 25 41.11	— 75	56 0.735	—13.1	72 29 41.2	4966	
	126	—	28 42.80	—	—	—	—	—	Druckfehler.
	137	—	—	—	28 1.550	—	70 10 30.9	—	Bemerkung verfällt.
	161	—	55 3.60	—	—	—	—	5463	
	162	—	55 4.14	—	—	—	—	5464	
	163	—	54 9.95	—	—	—	—	5445	
78.	14	—	3 10 28.91	—102	—	— 3.8	75 40 38.7	3681	Reductionsfehler.
	122	2	4 48 51.04	— 43	—	— 2.6	75 39 22.7	5369	
79.	31	—	—	—	—	— 0.6	75 26 30.3	—	Reductionsfehler.
	41	4	7 9 23.49	+ 26	—	— 5.1	77 20 30.7	7765	
	45	—	14 15.30	—	—	—	—	7837	
	70	—	39 34.83	—	—	—	—	—	33.
	87	—	57 23.59	—164	46 5.115	— 6.4	76 40 21.4	8621	
80.	25	d	3 38 37.31	+103	—	—11.5	69 42 52.0	4187	
	33	—	—	—	—	—	68 43 39.3	4301	Druckfehler.
	39	f	51 38.14	—	—	—	—	—	Bemerkung recht.
	74	—	4 17 18.48	—	—	—	—	4828	Reductionsfehler.
	180	—	5 30 32.16	—	—	—	—	6115	Reductionsfehler.
81.	44	—	5 16 4.17	— 79	—	— 4.4	63 28 58.3	5849	Reductionsfehler.
	55	d	21 53.79	+ 71	—	— 2.1	63 23 30.3	5990	34.
	89	—	50 28.05	— 62	—	—12.7	65 8 51.6	6408	Reductionsfehler.
82.	34	—	4 53 58.94	—	—	—	—	5458	Bemerkung verfällt.
	36	—	55 56.94	+ 97	—	—10.6	63 23 9.7	—	Reductionsfehler.
	67	—	5 22 21.64	— 51	—	— 5.2	61 17 21.4	5949	35.
	77	—	29 48.69	+ 33	—	—	—	—	
	91	—	40 5.66	—	—	—	—	6233	
	96	—	44 49.02	—	—	—	—	6320	Bemerkung recht.
83.	27	e	7 51 21.85	+ 77	—	— 1.3	54 35 35.9	8514	
	35	—	56 29.39	—	50 0.860	— 2.9	55 30 57.1	8596	
	50	—	8 10 26.12	—	—	—	—	8857	Bemerkung verfällt.
	58	—	15 35.14	+ 52	52 2.000	— 2.3	55 41 50.9	8945	
	71	2	26 58.25	— 14	—	— 2.2	54 15 55.1	9104	
	89	—	47 4.57	—	—	—	—	9428	Reductionsfehler.
	90	—	47 56.48	—	—	—	—	9442	Reductionsfehler.
	113	—	9 11 3.89	+ 79	—	— 2.9	55 45 50.9	9800	Reductionsfehler.
	127	—	23 55.39	—	—	—	—	9988	
	128	—	25 17.32	—	—	—	—	—	Bemerkung verfällt. 36.
	129	—	24 54.74	—	—	—	—	—	Bemerkung verfällt. 36.
84.	52	—	4 35 47.56	—	—	—	—	5140	Reductionsfehler.
	53	—	35 55.40	—	—	—	—	5143	Reductionsfehler.
	61	—	42 19.50	—	—	—	—	—	Bemerkung verfällt.
	62	—	41 59.66	—	—	—	—	—	Bemerkung verfällt.
85.	38	—	—	—	—	—	49 40 5.4	—	Druckfehler.
	85	—	4 54 58.90	—	—	—	—	—	Bemerkung verfällt.
	86	—	55 58.52	—	—	—	—	—	Bemerkung verfällt.
	87	—	56 26.50	—	—	—	—	—	Bemerkung verfällt.
	123	—	—	—	—	— 8.2	51 10 27.9	5893	Reductionsfehler.
	132	—	5 25 10.45	—	—	—	—	—	Druckfehler.
	144	—	31 13.59	—	—	—	—	—	Bemerkung verfällt.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
85.	145	—	5 31 58.60	—	—	—	—	—	Bemerkung verfällt.
86.	23	—	7 17 5.37	—	—	—	—	7892	Reductionsfehler.
	77	—	55 31.65	—	—	—	—	8564	
	78	—	56 31.11	—	—	—	—	8581	
	115	—	8 21 34.45	+ 58	—	— 9.1	51 11 18.8	—	Reductionsfehler.
	122	—	26 42.56	—	—	—	—	9112	
	123	—	27 30.56	—	—	—	—	9125	
87.	93	—	4 58 43.33	—	45 4.065	— 2.0	47 38 17.4	5549	Bemerkung recht.
	105	—	5 4 3.49	—	—	—	—	—	Bemerkung verfällt.
	106	—	4 18.46	—	—	—	—	5657	Bemerkung recht.
	107	—	5 50.45	—	—	—	—	5679	Bemerkung recht.
	127	—	19 5.01	—	—	—	—	5874	37.
	128	—	21 19.58	—	—	—	—	5916	37.
	129	—	20 32.33	—	—	—	—	5903	37.
	130	—	20 37.96	—	—	—	—	5905	37.
88.	78	—	7 58 21.46	—	—	—	—	8629	38.
	116	—	8 28 55.19	—	—	—	—	9162	Reductionsfehler.
89.	1	—	—	—	78 1.045	— 9.7	74 20 4.0	5532	
	90	—	6 13 31.75	—	—	—	—	6788	Reductionsfehler.
	92	—	11 5.14	—	—	—	—	—	Bemerkung verfällt.
	93	—	13 32.10	—	—	—	—	6812	Bemerkung recht.
90.	91	—	8 46 4.80	—	—	—	—	9423	39.
	97	—	50 28.39	—	—	—	—	9489	40.
91.	50	4.5	6 3 42.80	—	—	—	—	—	Bemerkung verfällt.
	66	—	15 17.10	—	—	—	—	6852	
	67	—	15 45.00	—	—	—	—	6876	
	143	—	7 7 33.70	—	—	—	—	7741	Bemerkung recht.
	144	2	9 13.63	— 46	—	— 9.6	69 44 35.6	—	Bemerkung recht.
	169	—	22 56.03	—	—	—	—	8009	41.
	170	—	24 38.58	—	—	—	—	8047	41.
	171	—	23 6.59	—	—	—	—	8011	41.
	172	—	27 3.46	—	—	—	—	8080	41.
92.	7	—	9 34 28.55	—	—	—	—	10167	
	66	e	10 18 5.18	+ 81	—	— 2.1	54 28 36.4	10837	
	89	—	37 18.37	—	—	—	—	11088	
	90	2	39 27.73	— 19	—	— 2.4	55 10 8.8	11134	
	94	—	43 6.75	—	44 0.605	— 2.1	54 58 26.1	11180	
	102	—	48 36.98	— 77	—	—12.1	56 40 33.4	11261	Reductionsfehler.
93.	114	b.1	7 7 43.95	—	—	—	—	7734	42.
94.	1	—	—	—	—	—	52 55 9.1	7618	Druckfehler.
	8	—	—	—	—	—	—	7697	43.
	121	3.4	8 23 56.75	—	—	—	—	—	Bemerkung verfällt.
95.	13	—	10 6 22.76	—	—	—	—	10658	Reductionsfehler.
	52	—	41 22.54	+ 21	—	—	—	11150	Reductionsfehler.
	59	—	45 1.19	—	—	—	—	11196	
	62	—	48 6.55	—	—	—	—	11232	44.
	63	—	47 53.45	—	—	—	—	11231	44.
	64	—	49 12.96	—	—	—	—	11255	44.
	74	1.2	58 21.03	— 26	—	— 2.5	52 6 41.8	11430	Bemerkung falsch.
	83	2.3	11 5 8.24	—	—	—	—	—	Bemerkung verfällt.
	94	—	16 10.53	—	—	—	—	11731	45.
	95	—	17 35.88	—	—	—	—	11751	45.
	96	—	16 57.90	—	—	—	—	—	Bemerkung recht.
96.	21	—	6 39 32.01	—	—	—	—	7281	46.
	61	—	7 10 45.00	—	—	—	—	7796	Reductionsfehler.
	70	4	16 35.36	+ 9	—	— 2.3	57 57 57.9	7893	Bemerkung verfällt.
	86	—	26 51.60	+123	—	—12.5	59 54 32.9	8065	47.
	89	d	30 30.49	+ 62	—	— 2.8	58 41 40.5	8131	
	138	—	8 4 24.14	—	—	—	—	8742	Bemerkung falsch.
97.	73	—	10 31 19.19	— 84	—	— 9.8	59 13 48.1	10986	Reductionsfehler. Bemerk. recht.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
97.	92	—	10 43 42.13	—	—	—	—	11172	Reductionsfehler.
98.	21	—	—	—	—	—	46 50 33.0	10824	Druckfehler.
	119	—	11 58 17.34	—	—	—	—	—	Bemerkung recht.
99.	2	—	8 31 43.37	—	—	—	—	9187	
	3	—	33 1.26	—	—	—	—	9216	
	4	—	33 25.26	—	—	—	—	9221	
	5	—	35 49.37	—	—	—	—	9259	Bemerkung recht.
	82	—	9 28 40.48	—	—	—	—	—	Bemerkung verfällt.
	128	4.5	10 1 36.29	—	—	—	—	—	Bemerkung verfällt.
100.	26	—	11 18 54.11	+114	—	— 4.5	55 51 13.7	11761	
	78	—	12 1 5.68	— 56	—	— 9.5	56 20 17.1	12356	
101.	26	f	8 32 38.07	+ 91	—	— 9.3	48 42 38.2	9261	48.
	28	—	—	—	—	—	46 44 24.3	9265	Druckfehler.
	56	—	57 14.23	—	—	—	—	9577	Bemerkung falsch.
	66	—	9 3 52.65	—	—	—	—	9691	Bemerkung falsch.
	84	2.3	20 19.94	— 9	—	— 2.3	46 47 0.3	9932	Bemerkung recht.
102.	90	—	10 20 51.28	—	—	—	—	10867	Bemerkung recht.
103.	11	—	—	—	—	—	—	11554	49.
	12	—	11 7 36.82	—	—	—	—	11594	49.
	13	—	8 22.01	—	—	—	—	11615	49.
	14	—	7 5.93	—	—	—	—	11581	49.
	15	—	8 18.82	—	—	—	—	11613	49.
	16	—	7 18.28	—	—	—	—	11584	49.
	29	—	32 48.28	—	—	—	—	—	50.
	36	—	38 24.29	+ 35	—	— 4.9	58 54 0.4	12050	51.
	76	—	12 9 23.78	—	—	—	—	12512	Druckfehler.
	77	e.f	9 3.37	+ 81	—	— 1.8	56 45 12.7	12510	52.
	150	—	13 0 58.89	—	—	—	—	13297	
	151	—	2 44.61	—	—	—	—	—	Bemerkung recht.
	152	—	3 53.07	—	—	—	—	—	Bemerkung recht.
104.	5	—	9 32 19.49	—	—	—	63 38 22.6	10129	Reductionsfehler.
	10	1	42 39.63	— 46	—	— 3.1	64 21 1.3	10286	
	63	—	10 25 44.21	—123	—	—13.7	65 39 54.0	10938	
	64	—	23 4.47	—	—	—	—	10894	Reductionsfehler.
	74	—	34 6.11	—	—	—	63 1 54.3	—	Reductionsfehler.
105.	31	—	11 59 5.80	+ 18	—	— 2.6	51 10 9.3	—	Reductionsfehler.
	32	—	58 53.20	—	—	—	—	—	Reductionsfehler.
	42	—	12 8 24.12	— 26	—	—11.0	54 11 46.2	—	Reductionsfehler.
	45	d	9 8.57	+ 57	—	0.0	50 40 25.8	12496	
	77	d	33 41.36	+ 60	—	— 2.9	52 35 22.9	12841	
106.	10	—	9 45 48.60	—	—	—	69 13.4	10338	
	12	—	45 13.96	—	—	—	69 38.4	10330	
	13	—	46 49.05	—	—	—	69 13.4	10339	
	19	—	54 59.26	—	—	—	69 25.3	10466	
	22	—	56 3.24	—	64 4.155	—	69 19.3	10485	53.
	25	—	10 0 46.03	—	—	—	66 19.5	10574	
	33	—	11 18.10	—	—	—	69 42.9	10729	
	34	—	12 45.94	—	—	—	65 44.9	10759	
	36	—	—	—	—	—	69 42.7	10771	
	37	—	16 43.89	—	—	—	69 39.3	10805	
	50	—	31 48.19	—	64 3.755	—	69 15.7	11014	Bemerkung verfällt.
	52	—	32 42.01	—	65 0.740	—	69 21.1	11029	
	66	—	45 49.76	—	—	—	68 45.5	11206	
	67	—	44 50.43	—	—	—	68 59.5	11197	
	69	—	—	—	—	—	69 25.0	—	Druckfehler.
	70	—	45 50.16	—	—	—	68 45.5	11207	
	76	—	52 34.59	—	—	—	67 17.5	11310	
	77	—	53 24.60	—	40 4.156	—	67 15.7	11329	
	79	—	56 46.95	—	—	—	68 24.6	11389	
	80	—	54 27.27	—	—	—	68 24.9	11349	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
106.	81	—	10 58 52.94	—	—	—	69 12.9	11428	
	83	—	11 2 33.59	—	—	—	69 19.5	11498	
	84	—	3 20.93	—	—	—	69 7.4	11509	
	85	—	3 22.47	—	—	—	68 43.1	11510	
	86	—	1 23.11	—	—	—	68 21.8	11472	
	87	—	4 26.80	—	—	—	68 10.5	11533	
107.	20	—	12 48 6.31	+ 78	—	—	57 17.0	13099	Reductionsfehler.
	21	—	49 36.08	—	—	—	56 26.4	13120	
	32	d	13 0 15.46	+ 59	—	—	54 51.7	13286	
	33	—	1 13.63	—	—	—	54 40.8	13323	
	34	—	—	—	—	—	54 24.1	13346	
	38	—	9 11.66	—	—	—	54 39.0	13430	
	47	—	16 52.92	—	—	—	56 43.5	13572	
	50	—	19 43.02	—	48 2.332	—	55 24.4	13614	
	58	—	29 20.73	—	57 4.432	—	56 9.3	13778	
	61	—	33 7.48	—	—	—	55 4.5	13835	
	66	—	37 56.59	—	61 1.462	—	56 31.2	13908	
	68	—	39 32.98	—	—	—	56 25.5	13939	
	71	—	38 37.69	—	—	—	54 32.9	13928	
	89	—	58 33.34	—	—	—	55 25.3	14216	
	93	—	14 2 9.45	—	—	—	56 10.7	—	Reductionsfehler.
108.	1	—	13 57 50.55	—	52 0.830	— 2.2	61 41 6.8	—	Druckfehler. Bemerkung recht.
	2	—	—	—	68 1.708	—12.6	63 1 37.7	—	Bemerkung recht.
	3	—	—	—	61 0.805	— 7.9	62 26 0.0	—	Bemerkung recht.
	4	—	14 2 8.90	—	47 4.408	— 4.6	61 18 52.6	14255	Bemerkung recht.
	7	—	4 50.49	—	—	—	—	14308	
	8	—	4 46.47	—	38 1.173	—	—	14302	Druckfehler.
	9	—	5 16.50	—	—	—	—	14309	
	12	—	9 12.70	—	—	—	61 8 48.2	—	Reductionsfehler.
	13	—	9 56.65	—	46 2.910	— 2.1	61 12 44.6	—	
	14	—	—	—	—	—	60 57 48.9	—	Reductionsfehler.
	15	—	—	—	56 2.082	—12.5	62 1 55.2	—	
	16	—	—	—	—	—	60 48 32.4	—	Reductionsfehler.
	17	—	—	—	—	—	60 17 35.3	—	Reductionsfehler.
	18	—	17 23.54	—	—	—	60 1 17.9	—	Reductionsfehler.
	19	—	16 56.95	—	—	—	59 43 11.7	—	Reductionsfehler.
	20	—	20 37.36	—	—	—	62 58 17.3	—	Reductionsfehler.
	30	—	26 55.69	—	—	—	—	14612	
	31	—	27 41.73	—	—	—	—	14624	
	32	—	27 34.37	—	—	—	—	14623	
	33	—	29 46.56	—	45 0.060	—	61 5 31.2	14654	
	34	—	30 21.76	—	—	—	—	14660	54.
	35	—	29 29.41	—	—	—	—	14648	
	36	—	29 55.11	—	—	—	—	14657	
	40	—	33 8.15	—	—	—	—	14708	
	41	—	37 34.06	—	40 3.020	— 2.4	60 42 49.5	14760	55.
	42	—	38 46.72	—	—	—	—	14783	
	43	—	37 48.58	—	—	—	—	14767	
	44	—	40 33.03	—	—	—	—	14804	Bemerkung recht.
	45	—	40 32.80	—	—	—	—	14805	Bemerkung recht.
	46	—	41 4.09	—	—	—	—	14810	
	47	—	43 5.93	—	—	—	—	14844	
	50	—	—	—	39 4.090	— 2.8	60 38 39.4	14856	
	51	—	44 49.58	—	39 4.100	— 2.5	60 38 40.2	14860	
	55	—	49 0.72	—	—	—	—	14902	56.
	56	—	48 59.80	—	—	—	—	14909	
	57	—	50 55.42	—	—	—	—	14941	
	61	—	52 13.57	—	—	—	61 56 5.9	14961	Reductionsfehler.
	62	—	53 4.89	—	—	—	—	14968	57.
	63	—	53 43.05	—	—	—	—	14977	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
108.	64	—	14 58 37.77	—	—	—	—	15034	58.
	65	—	58 7.00	—	—	—	—	—	
109.	37	—	—	—	47 —0.067	— 3.4	58 13 43.5	13724	
	105	—	14 21 13.81	—	49 —0.292	— 3.6	58 23 32.7	—	
110.	50	—	15 45 32.37	—	—	—	—	15629	
	51	—	46 42.53	—	—	—	—	15640	
111.	2	—	—	—	55 0.148	— 2.7	46 24 34.2	—	
	3	—	—	—	48 —0.020	— 1.4	45 49 27.7	—	
	4	—	—	—	52 3.355	—	46 12 1.9	13828	
	5	—	—	—	47 3.325	— 4.1	45 47 1.2	—	
	6	—	13 37 50.47	—	47 3.778	— 5.8	45 47 20.6	13864	
	13	—	—	—	59 2.310	— 7.6	46 46 10.3	—	
	14	—	—	—	60 —0.418	— 8.7	46 49 1.8	—	
	23	—	—	—	58 5.214	—12.8	46 43 20.7	—	
	38	—	14 2 55.13	—	—	—	—	14240	Bemerkung verfällt.
	48	—	10 15.22	—	46 —0.270	— 0.4	45 39 17.0	14374	
	52	—	—	—	53 4.342	— 3.1	46 17 49.7	14427	
	62	—	—	—	60 1.044	— 9.1	46 50 9.7	14517	
	66	—	—	—	—	—	47 23 39.4	—	Reductionsfehler.
	67	—	—	—	66 —0.118	— 8.6	47 19 15.9	14578	
	75	—	30 27.57	—	53 5.150	— 2.9	46 18 27.6	14644	
	88	—	—	—	—	—	46 5 54.4	14777	Reductionsfehler.
	89	—	—	—	—	—	46 11 29.1	14775	Reductionsfehler.
	92	—	—	—	48 2.337	— 1.8	45 51 17.3	14821	
	102	—	49 53.28	—	45 0.554	— 0.8	45 34 55.1	14906	
	108	—	—	—	63 1.070	— 9.8	47 5 10.2	14982	
	116	—	59 19.50	—	—	—	—	—	Bemerkung verfällt.
	121	1	15 4 40.52	— 23	—	— 5.5	46 24 0.8	—	Bemerkung recht.
	128	—	—	—	54 0.482	— 6.1	46 19 46.4	15154	Bemerkung recht.
	131	—	—	—	67 3.178	—10.8	47 26 47.6	15173	
112.	2	—	14 4 28.44	—	71 0.485	— 8.2	66 6 14.7	14270	
	3	—	7 26.27	—	43 3.462	— 3.3	63 48 39.8	—	
	8	—	10 57.78	—	37 0.175	— 1.6	63 16 6.7	14382	
	11	c	16 46.81	— 93	43 2.424	— 4.8	63 47 49.4	—	
	18	—	19 48.42	—	59 —0.068	— 6.5	65 5 50.3	14493	
	25	—	25 28.13	—	—	—	—	14566	Reductionsfehler.
	65	—	—	—	33 —0.113	— 2.3	62 55 52.4	14942	
	67	—	52 55.75	—	—	—	—	14938	59.
	68	—	53 5.99	—	—	—	—	14948	59.
	79	—	15 1 58.05	—	71 0.346	— 9.9	66 6 6.4	—	
	97	—	—	—	50 0.202	— 2.3	64 21 7.2	—	
	100	—	18 55.91	—	38 —0.060	— 2.1	63 20 55.1	—	
	101	—	—	—	34 1.994	— 1.7	63 2 32.2	15324	
	103	—	21 1.30	—	—	—	—	15317	Druckfehler.
	106	—	—	—	42 0.515	— 1.6	63 41 22.7	15367	
	118	—	36 4.22	—	—	—	—	15510	60.
	128	—	44 25.35	—	—	—	65 52 52.6	15615	Reductionsfehler.
113.	4	—	—	—	49 1.800	— 2.6	47 56 12.2	14311	
	11	—	—	—	46 3.688	— 3.4	47 42 40.3	14418	
	13	—	14 13 36.22	—	58 0.600	—10.3	48 40 8.0	—	Bemerkung recht.
	14	—	—	—	59 —0.900	— 7.5	48 44 0.1	14449	
	16	—	16 30.52	—	39 2.645	— 1.5	47 6 53.0	14450	
	17	—	—	—	63 —0.288	— 8.5	49 4 27.9	—	Bemerkung recht.
	18	—	—	—	65 —0.973	— 7.0	49 13 57.2	—	Bemerkung recht.
	19	—	—	—	53 4.740	— 3.3	48 18 29.9	14492	
	20	—	21 24.23	—	36 0.530	— 3.2	46 50 11.8	14518	
	21	—	21 19.95	—	46 —0.995	— 0.3	47 39 2.8	14514	
	22	—	—	—	46 —0.673	— 0.5	47 39 17.8	14526	
	25	—	22 3.44	—	54 —0.644	— 4.2	48 19 15.5	14528	
	28	—	23 33.14	—	56 4.778	—12.3	48 33 22.7	14551	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
113.	30	—	—	—	57 2.642	—11.0	48 36 43.4	14581	
	33	—	14 27 41.13	—	48 1.854	— 1.8	47 51 15.5	14603	
	36	—	—	—	32 2.653	— 0.3	46 31 54.7	14633	
	38	—	32 4.29	—	45 0.408	— 2.7	47 35 6.5	14663	
	44	—	34 56.63	—	54 4.784	— 5.0	48 23 30.3	14713	
	45	—	—	—	52 1.842	— 2.2	48 11 14.5	14728	
	46	—	—	—	54 4.762	— 5.2	48 23 29.1	14735	
	48	—	—	—	62 1.674	—10.1	49 0 58.7	14758	
	49	—	37 35.01	—	65 1.635	— 8.1	49 15 58.9	—	Bemerkung recht.
	50	—	—	—	62 1.658	— 9.2	49 0 58.9	14759	
	51	—	—	—	49 0.798	— 2.7	47 55 24.9	14768	
	53	—	43 10.90	—	61 4.870	—10.8	48 58 28.6	14820	
	54	—	—	—	62 2.927	—10.6	49 1 57.3	14816	
	56	—	42 50.75	—	54 4.780	— 5.0	48 23 30.1	14813	
	57	—	—	—	56 2.878	—12.0	48 31 53.6	14837	
	58	—	—	—	56 —0.335	—10.6	48 29 23.6	14839	
	59	e	44 3.09	—	58 —0.908	— 9.6	48 38 57.6	14834	Faden Druckfehler.
	60	—	—	—	57 —0.683	—10.7	48 34 7.1	14861	
	61	—	—	—	39 2.764	— 1.9	47 6 58.3	14868	
	64	—	—	—	45 2.658	— 1.4	47 36 53.8	14886	
	73	—	—	—	39 0.378	— 1.8	47 5 6.0	14981	
	76	—	56 31.95	—	58 4.905	—11.1	48 43 29.9	14990	
	77	—	—	—	65 4.774	— 9.3	49 18 25.6	15012	
	79	—	—	—	39 0.622	— 1.2	47 5 18.1	15028	
	80	—	59 42.34	—	39 0.472	— 1.0	47 5 11.2	15022	
	83	—	—	—	35 2.843	— 2.3	46 47 1.6	15067	
	88	—	—	—	44 —0.388	— 2.1	47 29 29.6	15129	
	89	—	15 6 2.24	—	40 2.795	— 1.0	47 12 0.6	15111	
114.	1	—	—	—	76 —0.895	— 9.6	70 9 18.3	—	
	3	—	16 2 3.23	—	75 —0.374	—11.4	70 4 41.0	—	
	22	—	16 25.33	—	44 2.795	— 4.2	67 32 17.3	—	
	23	—	18 30.60	—	45 3.794	—	67 38 6.8	16090	
	25	—	22 38.34	—	45 3.689	—	67 37 57.3	16152	
	29	—	25 25.93	—	29 2.965	— 3.6	66 17 25.9	16193	
	35	—	29 8.28	+ 41	73 —0.714	— 7.0	69 54 29.4	16249	
	44	—	38 34.57	—	54 —0.390	—10.6	68 19 41.1	16409	
	48	—	—	—	49 1.700	— 3.0	67 56 26.9	16402	
	51	—	42 6.43	—	43 —1.582	— 0.9	67 23 54.7	—	
	58	—	49 39.45	—	40 —0.360	— 1.1	67 9 52.0	—	
	60	—	47 34.06	+137	—	— 7.2	68 21 59.5	—	61.
	103	—	17 20 19.19	—	35 2.930	— 4.3	66 47 23.7	17039	
	104	—	—	—	44 3.820	— 2.6	67 33 7.2	17036	
	111	—	25 26.48	—	66 2.915	—10.5	69 22 16.7	17114	Bemerkung recht.
	123	—	33 33.05	+ 24	—	—	—	—	Reductionsfehler.
	128	—	—	—	65 4.620	— 9.1	69 18 38.3	17326	
	131	—	39 36.62	—	72 3.855	—10.9	69 53 0.5	17371	
	132	—	41 16.42	—	70 3.943	—13.9	69 43 1.6	17399	
115.	3	—	14 5 16.57	—	35 2.653	— 2.4	70 46 52.4	14282	
	28	—	26 59.39	—	—	—	—	14606	Reductionsfehler.
	29	—	—	—	—	—	73 29 58.6	14631	Druckfehler.
	35	—	31 24.33	—	25 4.950	— 3.0	69 58 39.9	14651	
	54	—	—	—	—	—	70 8.8	14866	Bemerkunng recht.
	100	—	15 24 50.12	+148	30 —0.826	+ 0.5	70 19 11.6	15362	
	101	—	29 35.34	—114	30 —1.100	— 0.4	70 18 57.8	15425	
	112	f	32 32.85	+177	57 2.208	—13.6	72 36 20.4	15477	62.
	133	d	51 1.72	+119	—	— 2.7	70 51 12.2	—	
116.	11	e	14 34 16.46	+129	—	—12.5	69 27 18.8	14700	
	66	—	15 14 50.82	—	24 3.553	—	65 53 15.2	15234	
	119	—	49 13.31	—	42 0.010	—	67 20 28.6	15670	
117.	1	—	—	—	—	—	58 9 1.5	16520	Druckfehler.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
117.	20	f	16 58 44.95	+ 78	—	— 1.8	57 25 41.1	16686	
	21	e	58 45.99	+ 93	—	— 2.6	57 27 15.3	16688	
	29	—	17 4 59.34	—	62 1.308	— 9.5	59 29 52.6	16785	
	54	—	22 48.11	—	—	—	—	17056	Reductionsfehler.
118.	1	3	15 5 35.70	—	—	—	—	—	Bemerkung verfällt.
	9	—	10 35.75	—	67 4.160	—11.4	47 26 39.8	15175	
	35	d	26 42.95	+ 41	—	— 5.4	46 42 37.1	15382	
	62	—	43 35.72	—	—	—	—	—	Reductionsfehler.
	128	—	16 24 47.96	—	40 1.157	— 2.9	45 9 26.7	16175	
	130	—	25 18.03	—	—	—	—	16168	Druckfehler.
	141	—	30 41.40	—	—	—	—	16268	63.
119.	4	—	17 30 33.52	+154	—	— 2.5	67 26 3.1	—	Reductionsfehler.
	19	—	—	—	40 —0.076	— 0.8	67 12 5.6	17412	
	57	—	18 6 53.51	—	—	—	—	—	Reductionsfehler.
	78	—	25 3.73	+106	—	—	—	—	Reductionsfehler.
	88	2	34 29.51	— 45	—	— 8.2	69 2 10.0	—	Bemerkung recht.
	122	—	56 19.77	—	—	—	66 42 3.1	—	Reductionsfehler.
120.	6	—	15 6 35.	— 38	—	— 0.2	73 39 51.1	15084	64.
	11	—	5 2.64	+271	—	—12.6	80 9 8.7	15081	
	82	—	—	—	—	—	78 9 15.5	15847	Druckfehler.
121.	31	—	—	—	36 —1.423	+ 0.3	63 19 3.3	16287	
	35	2	16 35 0.08	— 39	—	—11.5	65 6 11.3	16337	
122.	22	—	—	—	33 4.008	—	75 38 14.3	16172	Bemerkung recht.
	29	—	16 25 17.30	—	—	—	—	16261	Bemerkung recht.
	40	—	—	—	50 0.988	—	—	—	Bemerkung recht.
	62	—	54 4.32	—	—	—	—	16675	65.
	63	—	56 52.98	—	—	—	—	16717	
	64	—	57 55.73	—	—	—	—	16728	
	66	—	—	—	47 5.087	— 3.7	76 49 5.8	16716	
	87	—	—	—	22 3.673	—	74 43 2.2	16956	Bemerkung verfällt.
	91	—	—	—	23 —2.650	—	74 43 2.6	16957	Bemerkung verfällt.
	111	—	—	—	—	— 3.7	77 25 31.5	—	Reductionsfehler.
	122	—	17 43 5.34	—	—	—	—	17494	Druckfehler.
	169	—	18 15 6.09	—	—	—	—	18105	
	170	—	20 1.93	—	—	—	—	18201	
	181	4	27 55.07	—	—	—	—	18374	
123.	17	—	16 12 12.20	—	63 1.958	—11.9	65 37 20.2	16058	
	50	—	35 22.45	—	—	—	—	16415	Reductionsfehler.
	128	—	17 30 51.73	+102	—	— 8.9	65 26 43.5	17298	Reductionsfehler.
124.	73	d	17 19 12.89	+120	—	— 9.2	73 9 59.2	17160	
	89	1	32 21.33	— 51	—	+ 0.3	70 53 39.0	17264	66.
	100	—	36 37.13	—	66 —2.170	— 8.8	73 18 29.0	17396	Bemerkung recht.
	106	—	44 13.91	—	55 3.593	—	72 28 3.7	17531	
	136	—	18 6 16.29	—	—	—	—	17932	Reductionsfehler.
	138	—	8 57.21	—159	43 —0.952	— 5.8	71 24 29.5	18004	Bemerkung verfällt.
	139	—	9 36.81	—156	43 4.323	— 7.5	71 28 36.2	18015	
	152	—	18 6.90	—	22 —2.608	— 0.6	69 38 16.6	—	67.
	162	—	27 46.27	—211	—	—16.3	74 4 4.6	18350	Reductionsfehler.
125.	5	—	16 32 48.23	+ 76	—	—	—	16379	Reductionsfehler.
	25	—	—	—	56 —2.296	— 9.1	61 59 32.8	16624	
	91	—	17 32 47.02	—	—	—	—	17342	68.
	107	—	42 37.97	+ 90	—	—	—	17505	Reductionsfehler.
	140	—	18 4 45.93	—	40 1.010	— 3.2	60 42 14.4	17925	
	150	—	7 35.90	—	66 3.860	—10.4	62 54 21.4	17984	
	153	1	11 52.28	— 48	—	—10.2	63 32 53.5	18054	
126.	11	—	16 40 37.06	—	—	—	—	—	Bemerkung verfällt.
	12	—	40 51.60	—	—	—	—	16493	69.
	21	—	45 37.24	+ 63	—	— 6.4	46 55 22.1	16568	Reductionsfehler.
	27	—	52 28.17	—	51 0.568	— 3.5	46 6 43.3	16667	
	81	3.d	17 26 56.20	—	47 —0.920	— 2.1	45 45 34.5	17219	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
126.	116	—	—	—	45 —1.612	+ 0.6	45 35 4.4	17639	
127.	2	—	16 30 2.35	+ 58	—	— 9.4	69 1 9.8	16333	70.
	51	—	17 5 26.89	—	—	—	—	16878	Reductionsfehler.
	69	—	21 3.12	—	67 —3.635	— 9.6	69 22 28.8	—	Bemerkung verfällt.
	87	—	32 41.86	—	66 —1.903	— 6.6	69 18 53.6	17325	
128.	96	—	19 1 18.11	—	50 —0.670	— 1.7	52 31 16.7	18927	
	97	—	19 2 15.16	—	—	—	—	—	Druckfehler.
129.	6	—	16 57 13.40	—	36 2.387	— 1.4	48 51 1.2	16729	
	21	—	17 5 55.74	—	—	—	—	16872	Reductionsfehler.
	43	—	—	—	42 0.570	— 1.0	49 19 35.9	17112	
	53	—	27 57.85	—	—	—	50 47 50.0	17234	Reductionsfehler.
	54	—	26 5.63	—	—	—	51 13 10.5	17203	Reductionsfehler.
	55	—	—	—	—	—	50 47 50.3	17233	Reductionsfehler.
	56	—	—	—	—	—	50 58 56.2	17248	Reductionsfehler.
	66	—	33 35.53	—	—	—	—	—	Druckfehler.
	77	—	40 1.30	—	—	—	—	17461	
	82	—	42 46.47	—	48 —1.300	+ 0.3	49 48 9.0	17501	
	94	—	50 46.06	+ 85	—	— 2.8	50 23 46.7	17636	Reductionsfehler.
	106	—	18 0 48.00	—	—	—	—	17853	
	117	—	—	—	55 —2.268	— 0.8	50 22 22.3	17941	
	118	—	7 24.43	—	—	—	—	—	Reductionsfehler.
	122	1	10 44.48	— 32	—	— 8.6	51 26 54.6	18034	
	125	—	12 51.70	— 72	57 —0.425	—12.4	50 33 37.5	18082	
	132	—	16 17.65	—	62 —2.384	— 7.3	50 57 10.3	18141	
	142	c	22 5.94	—	—	—	—	—	Bemerkung verfällt.
	151	—	28 7.11	—	—	—	—	—	Reductionsfehler.
130.	50	—	—	—	44 4.046	— 2.3	55 2 28.4	18335	
131.	16	—	19 36 38.28	—	52 —0.358	— 4.7	48 8 58.4	—	Bemerkung recht.
	39	—	48 20.22	+ 70	—	—	47 42 13.9	—	Reductionsfehler.
	76	2	20 10 11.22	— 15	—	— 2.6	48 3 51.0	20260	
	80	—	11 28.87	+ 26	—	— 0.6	—	20295	Reductionsfehler.
132.	1	—	17 26 49.55	+ 97	—	— 2.3	67 53 27.9	—	Reductionsfehler.
	37	—	—	—	76 1.810	—11.1	70 10 24.2	17669	
	52	—	18 5 26.61	—103	—	— 4.7	66 55 22.6	17936	
	59	e	5 26.51	+128	—	— 3.2	66 55 26.1	18013	
	66	—	—	—	—	—	66 5 15.7	—	Druckfehler.
	82	4	29 32.54	—	—	—	—	—	Bemerkung verfällt.
133.	25	—	19 36 21.85	+ 30	—	— 3.1	46 25 19.6	19523	Reductionsfehler.
	35	1.2	41 3.48	—	—	—	—	—	Bemerkung verfällt.
	64	—	52 7.07	—	—	—	—	19837	Reductionsfehler.
	76	—	—	—	57 —0.170	— 9.9	46 33 42.1	19940	
	118	—	20 17 55.95	—	—	—	45 31 12.1	20448	Reductionsfehler.
	125	—	21 30.40	—	47 1.408	— 3.7	45 45 2.6	20537	
	144	—	28 53.89	—	54 6.043	— 5.6	46 23 39.0	20736	
134.	27	—	—	—	—	—	47 24 10.2	—	Druckfehler.
	72	—	20 10 39.04	—	—	—	—	20307	Reductionsfehler.
	78	—	15 38.87	—	55 3.987	— 4.0	48 25 53.8	20398	
	86	—	21 22.76	—	—	—	—	—	71.
	87	—	21 24.30	—	—	—	—	—	71.
	88	—	20 37.39	—	—	—	—	—	71.
	89	—	21 38.43	—	—	—	—	—	71.
	90	—	22 28.41	—	—	—	—	—	71.
	91	—	23 34.15	—	—	—	—	—	71.
	92	—	23 32.88	—	—	—	—	—	71.
	160	—	59 49.15	—	55 1.926	— 3.6	48 24 17.1	21605	
	182	—	—	—	61 —2.387	— 5.8	48 50 51.8	—	Bemerkung
	219	—	—	—	56 1.250	—11.5	48 28 37.4	22699	
135.	69	1.3	20 53 53.32	— 72	—	—10.8	73 58 31.0	21412	72.
	70	—	53 6.40	—	—	—	—	21410	73.
	77	2	58 51.86	—	—	—	—	—	Bemerl

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
135.	115	—	21 30 39.56	—	—	—	72 57 27.8	22529	Reductionsfehler.
	116	—	30 7.02	—	—	—	—	22467	Reductionsfehler.
	133	—	42 25.62	—	—	—	—	22853	Reductionsfehler.
	138	—	46 22.35	—	—	—	—	22943	74.
	139	—	43 49.45	—	—	—	—	22885	74.
	140	—	44 31.59	—	—	—	—	22902	74.
	141	—	45 55.94	—	—	—	—	22936	74.
	142	—	48 15.14	—	—	—	—	22993	74.
	143	—	48 28.21	—	—	—	—	23001	74.
	153	—	22 1 28.66	—	—	—12.8	73 40 7.1	—	Reductionsfehler.
	155	—	0 47.27	—	64 0.684	— 9.8	73 6 12.5	23392	
136.	27	—	20 10 56.07	—	36 2.270	— 1.8	48 52 35.0	20281	
	40	—	19 51.54	—	—	—	—	—	Bemerkung recht.
	41	—	19 39.96	—	60 6.295	— 8.9	50 55 37.3	—	
	104	—	51 43.77	—	—	—	—	21371	
	159	—	21 23 23.77	—	48 2.756	— 2.6	49 52 57.1	22312	
137.	17	—	20 9 31.95	—	31 7.690	— 2.5	51 1 18.6	—	Bemerkung recht.
	21	—	10 0.49	—	—	—	—	20282	Reductionsfehler.
	54	—	—	—	69 —1.700	— 8.2	54 3 52.0	20679	
	79	—	39 56.97	—	69 —2.140	— 8.3	54 3 31.2	—	Bemerkung recht.
	80	—	40 55.11	—	—	—	53 55 56.9	—	Reductionsfehler.
	95	—	47 28.77	+ 78	—	— 8.7	53 27 32.4	—	Reductionsfehler.
	96	—	47 29.06	+ 94	—	— 9.1	53 27 22.8	—	Reductionsfehler.
	160	e	21 21 48.09	+ 70	—	+ 0.5	52 4 7.3	22282	
	193	—	40 9.99	—	65 —2.045	— 7.8	53 43 36.2	22818	
	209	—	47 18.24	— 45	—	—10.4	53 44 24.6	22984	Reductionsfehler.
	219	—	49 32.43	—	—	—	—	23020	Reductionsfehler.
	234	—	—	—	—	—	52 18 15.1	23308	Reductionsfehler.
	236	2	59 14.44	—	—	—	—	23327	75.
138.	38	—	20 49 55.63	—	59 2.058	— 8.0	56 17 8.9	21311	
	77	—	21 12 28.15	—	76 —0.448	—10.5	57 40 8.4	—	
	91	—	18 56.34	+ 75	—	— 0.4	55 5 5.0	22170	Reductionsfehler.
	117	—	—	—	45 —2.752	+ 1.7	55 3 32.1	—	Bemerkung verfällt.
	204	—	22 19 29.99	—	30 6.173	+ 1.1	53 55 31.9	24043	
	219	—	29 5.32	—	—	—	—	—	Bemerkung recht.
139.	79	—	21 22 35.50	—	28 0.825	— 0.4	56 40 28.5	—	Bemerkung verfällt.
	89	—	30 7.84	—	—	—	—	—	Reductionsfehler.
	96	—	33 45.97	— 23	—	— 2.6	58 44 40.3	22607	Reductionsfehler.
	108	—	40 14.95	—	—	—	—	22821	
	119	—	49 12.77	—	32 3.882	— 2.9	57 2 50.0	23034	
140.	5	—	20 35 18.88	—	—	—	—	—	Bemerkung verfällt.
	7	—	35 44.02	—	—	—	—	20900	76.
	9	—	37 55.20	—	—	—	—	20932	
	10	—	38 54.55	—	—	—	—	—	Bemerkung recht.
	53	—	21 4 58.00	—	—	—	—	21718	
	57	—	—	—	60 1.060	— 9.5	62 20 30.6	21800	
	76	—	16 32.15	+113	47 4.020	— 5.2	61 17 54.7	22083	
	77	—	17 28.75	+ 75	47 3.940	— 4.1	61 17 52.1	22118	
	155	—	22 1 31.56	+ 33	—	—	—	—	Reductionsfehler.
	164	e	4 46.92	+101	—	— 1.4	60 15 9.8	23542	
141.	63	2	21 5 14.04	— 16	—	— 2.9	45 31 25.7	21742	
	93	—	18 19.61	—	—	—	—	—	Bemerkung recht.
142.	7	—	21 30 54.50	—	37 0.030	— 0.8	57 21 28.2	22502	
	74	—	22 8 44.71	—	62 —0.030	— 9.3	59 26 19.3	23686	
	99	—	25 56.17	+ 26	67 —1.717	— 8.2	59 50 2.0	24232	77.
	101	—	27 26.13	—	68 —1.917	— 9.0	59 54 51.9	24271	
	102	—	—	—	68 —3.743	— 6.7	59 53 29.3	24274	
	117	—	41 30.66	—	—	—	—	—	Reductionsfehler.
	142	d	55 4.99	+ 57	—	+ 3.0	58 13 23.4	24993	
143.	11	—	23 26 7.76	—	70 —0.883	—14.3	69 40 54.6	25711	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
143.	67	—	23 58 39.58	—	—	—	68 0 21.9	—	Reductionsfehler.
	68	—	57 7.13	—	—	—	67 31 9.7	—	Reductionsfehler.
	69	—	56 41.11	—	—	—	67 38 39.3	—	Reductionsfehler.
	70	—	58 10.57	—	—	—	67 18 43.4	—	Reductionsfehler.
	71	—	57 3.80	—	—	—	67 16 38.2	—	Reductionsfehler.
	72	—	—	—	—	—	66 40 0.3	—	Reductionsfehler.
	73	—	0 0 23.08	—	—	—	66 23 46.9	—	Reductionsfehler.
	74	—	—	—	—	—	66 25 8.7	—	Reductionsfehler.
	98	—	15 28.48	—	—	—	—	—	Bemerkung verfällt.
	123	—	36 54.32	—105	71 —3.240	— 8.1	69 44 11.2	668	
144.	15	—	22 5 30.74	—	68 —2.082	— 8.9	73 43 33.9	23550	
	16	2	5 53.15	— 39	68 —1.572	— 9.4	73 43 57.2	23597	
	48	4	24 7.76	0	—	— 1.6	70 11 53.7	24148	
	64	—	33 24.88	—	—	—	—	24404	Reductionsfehler.
	76	—	39 56.43	+ 62	—	— 7.8	73 30 24.4	24599	78.
	80	—	45 26.94	—	69 —0.005	—14.6	73 50 5.2	24761	
	143	—	23 23 39.65	—	—	—	—	25627	Reductionsfehler.
	145	—	24 1.11	—	—	—	—	25630	
145.	9	—	1 6 42.80	—	—	—	—	1245	
	46	—	25 48.33	—	44 1.876	— 4.2	47 46 23.4	1658	Bemerkung recht.
	76	—	39 31.19	—	40 —0.970	— 1.8	47 24 12.9	2000	
	118	—	58 29.22	—	—	—	—	2377	Druckfehler.
	124	—	—	—	31 5.058	— 3.9	46 43 52.3	—	Bemerkung verfällt.
	149	—	2 12 16.53	—	58 2.898	—10.9	48 57 4.4	—	Bemerkung recht.
	176	3.4	24 53.07	—	—	—	—	—	Bemerkung verfällt.
146.	3	3	21 35 22.50	—	—	—	—	22661	
	91	—	—	—	47 2.877	—	45 47 1.5	23936	Bemerkung recht.
	103	—	22 22 50.50	—	—	—	—	—	
	151	—	43 48.92	—	—	—	—	—	Bemerkung verfällt.
147.	35	—	0 1 24.03	—	48 0.510	— 0.9	45 50 13.0	2	
	36	—	3 10.24	— 17	—	— 2.6	45 31 11.1	34	Reductionsfehler.
	44	—	7 52.48	—	—	—	—	132	79.
	45	—	8 14.85	—	—	—	—	140	79.
	46	—	7 55.35	+ 34	49 1.620	— 2.6	45 56 3.4	133	79.
	47	—	8 21.17	—	—	—	46 1.6	144	79.
	48	—	8 20.55	—	—	—	—	143	79.
	49	—	9 3.40	—	—	—	—	157	79.
	50	—	9 52.55	—	—	—	—	165	79.
	51	—	9 1.27	—	—	—	—	156	79.
	52	—	10 30.60	—	—	—	—	177	79.
	71	2	20 6.36	— 16	—	— 9.4	47 28 37.4	365	
	83	—	24 55.23	—	—	—	—	—	Bemerkung recht.
	84	—	25 51.47	—	—	—	—	—	Bemerkung recht.
	85	—	25 40.61	—	49 —0.364	— 1.7	45 54 31.2	468	Bemerkung recht.
	86	—	25 43.94	—	—	—	—	—	Bemerkung recht.
	87	—	26 15.09	—	—	—	—	—	Bemerkung recht.
	113	—	41 49.63	—	—	—	—	778	Reductionsfehler.
	118	—	—	—	61 4.063	—	46 57 49.2	—	Bemerkung recht.
	119	e	44 12.90	+ 69	—	— 9.2	47 12 11.5	852	
	135	1	53 42.45	— 36	—	— 2.7	46 3 48.8	984	
	153	—	1 3 24.98	— 48	—	— 5.5	45 47 40.4	1191	Reductionsfehler.
148.	55	—	23 39 52.46	— 64	58 0.892	—11.6	77 40 45.3	26009	
	124	b	0 36 13.17	—205	—	— 7.1	76 49 52.8	644	
	143	—	48 51.81	—163	45 1.776	— 5.9	76 36 32.4	895	
	154	—	57 35.26	—208	—	—13.3	79 13 39.9	935	Reductionsfehler.
149.	32	—	22 19 41.14	—	33 0.870	— 2.7	51 6 38.2	—	Bemerkung verfällt.
	40	—	22 41.06	—	—	—	—	—	
	45	—	25 8.99	—	—	—	—	—	Bemerkung verfällt.
150.	58	2.3	22 17 53.33	—	—	—	—	—	Bemerkung verfällt.
	61	d	18 19.32	+ 49	—	— 1.3	50 24 16.4	—	Bemerkung recht.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
150.	65	—	22 19 34.61	—	63 1.502	— 9.4	51 6 31.1	—	Bemerkung recht.
	79	—	25 24.58	—	—	—	—	24227	Bemerkung recht.
	94	—	33 35.02	— 19	—	— 5.1	50 20 54.7	24460	
	189	—	—	—	40 —0.065	— 0.7	49 10 26.3	25597	
151.	2	—	1 29 41.00	—	—	—	—	1752	Druckfehler.
	70	b.c	2 11 57.97	— 92	—	— 6.3	63 6 51.2	2596	80.
	85	—	23 7.44	—	44 6.010	— 4.9	64 5 27.3	2860	
152.	27	—	—	—	35 4.160	— 2.7	44 47 37.4	1487	
	61	—	—	—	42 2.318	— 2.7	45 21 11.0	—	Bemerkung recht.
	69	—	1 37 49.57	—	—	—	—	—	81.
	75	—	40 20.05	—	—	—	46 29 12.7	2023	Reductionsfehler.
	76	—	42 2.84	—	—	—	46 38 32.2	2051	Reductionsfehler.
	89	—	48 56.67	—	—	—	—	2186	Druckfehler.
	114	—	2 1 12.63	—	58 6.121	—12.7	46 43 59.4	2425	Bemerkung recht.
	117	—	—	—	47 —1.704	— 1.2	45 43 3.8	2433	
	159	e	25 20.57	+ 59	—	— 0.1	45 13 47.7	2903	
153.	17	—	1 9 7.38	—	—	—	—	—	Bemerkung verfällt.
	18	—	9 27.58	—	—	—	—	—	Bemerkung verfällt.
	42	f	21 38.70	+ 84	—	— 9.1	51 17 5.4	1587	
	51	3.4	27 44.65	—	—	—	—	—	Bemerkung verfällt.
	119	—	—	—	59 4.020	— 7.9	50 47 51.0	2561	
	151	—	2 25 6.10	—	—	—	—	2882	82.
	152	—	25 20.34	—	—	—	—	2886	82.
	153	—	25 57.22	—	—	—	—	2896	82.
154.	29	—	1 15 32.59	—	—	—	—	1490	83.
	37	—	22 57.07	—	69 5.720	—11.6	57 9 17.3	1618	
	83	—	43 25.16	—	69 3.010	—10.9	57 7 10.6	2073	
	116	—	59 28.60	—	—	—	—	2397	Reductionsfehler.
	134	—	2 7 5.16	—	34 —1.570	+ 0.7	54 8 46.9	2565	
	144	—	10 28.23	—	—	—	—	2634	Bemerkung recht.
	147	—	12 5.30	—	—	—	—	2678	Reductionsfehler.
155.	96	—	2 22 15.17	—222	—	—16.1	78 50 17.8	2843	Reductionsfehler.
	122	—	38 51.13	—	33 0.330	— 6.6	75 34 33.9	3185	84.
156.	83	—	0 8 43.86	—	56 2.014	—12.0	56 2 32.4	166	
	107	2	20 47.14	— 25	—	—12.8	56 4 54.1	397	
	109	—	22 4.92	— 70	—	—13.3	56 12 14.5	420	Reductionsfehler.
	153	—	—	—	51 4.000	— 3.8	55 39 13.6	806	
	171	—	51 55.26	—	—	—	53 44 45.8	979	Reductionsfehler.
	172	—	54 48.45	—	—	—	54 9 7.4	1034	Reductionsfehler.
	173	—	54 15.32	—	—	—	54 11 23.9	1022	Reductionsfehler.
	174	—	55 0.82	—	—	—	54 13 41.8	1044	Reductionsfehler.
	175	—	54 50.58	—	—	—	55 0 33.0	1036	Reductionsfehler.
	176	—	55 27.83	—	—	—	54 56 18.9	1055	Reductionsfehler.
	177	—	55 19.41	—	—	—	55 59 50.0	1052	Reductionsfehler.
	194	—	1 4 32.30	—	—	—	—	1220	Reductionsfehler.
157.	3	—	23 31 39.62	—	—	—	—	—	Reductionsfehler.
	13	—	41 23.34	—	—	—	—	26055	Reductionsfehler.
	86	—	0 32 50.05	—	—	—	—	—	Bemerkung recht.
	87	—	34 28.18	—	—	—	—	—	Bemerkung recht.
	88	—	34 34.43	—	—	—	—	—	Bemerkung recht.
	96	—	42 12.84	— 70	—	— 8.3	72 53 39.8	800	85.
	111	—	—	—	33 —0.840	— 2.0	70 33 38.6	999	
158.	58	—	—	—	44 1.052	— 3.1	47 20 16.2	24052	
	64	—	—	—	—	—	47 27 6.5	24139	Reductionsfehler.
	81	—	22 31 13.86	—	—	—	—	—	Bemerkung verfällt.
	86	—	32 2.11	+ 69	—	—	—	24449	Reductionsfehler.
	121	—	49 43.12	—	58 —0.160	— 9.9	48 29 12.6	24909	
	122	—	—	—	—	—	48 31 41.8	24911	Druckfehler.
	151	—	—	—	57 6.085	—10.5	48 29 4.9	25255	Bemerkung recht.
	156	—	23 6 50.58	—	—	—	—	25304	86.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
158.	157	—	23 6 28.46	—	—	—	—	25296	86.
	178	—	17 38.79	+ 69	—	— 8.5	48 47 13.7	25545	Reductionsfehler.
159.	6	—	0 36 8.02	—	34 0.867	— 3.9	60 8 36.8	689	87.
	59	2	1 5 53.63	— 33	—	— 4.4	61 57 15.4	1288	
	77	—	15 37.13	—	48 0.053	— 3.7	61 17 58.8	1488	
	80	—	14 17.88	—	73 —1.290	— 7.5	63 21 51.9	1464	
	109	1	31 9.40	— 31	—	— 3.1	61 52 28.4	1819	
160.	114	—	23 41 21.06	+ 38	—	—	—	26066	Reductionsfehler.
	118	—	—	—	61 2.678	— 8.5	62 25 37.2	26108	88.
	142	—	59 32.59	—	62 —0.332	— 8.6	62 28 15.8	—	89.
	143	—	58 9.77	—	60 3.162	—10.3	62 20 58.2	—	89.
161.	4	—	3 33 30.09	—	—	—	—	4081	Reductionsfehler.
162.	51	—	—	—	55 —2.763	— 0.1	61 52 40.6	1148	90.
	105	—	1 25 5.16	—	—	—	59 57 42.4	1698	Reductionsfehler.
163.	19	—	4 35 21.08	—	35 2.276	— 2.1	51 16 24.6	5150	
	78	—	5 8 38.00	—	—	—	—	5737	Reductionsfehler.
	79	—	9 12.20	—	—	—	—	5738	Reductionsfehler.
	119	—	29 54.00	—	48 4.122	— 2.0	52 22 51.3	6096	
	141	—	42 40.00	—	—	—	—	6298	91.
	143	—	43 46.44	+ 31	—	— 4.1	52 49 52.9	6312	Reductionsfehler.
	152	—	—	—	—	—	51 14 51.4	6412	Druckfehler.
	200	—	—	—	—	—	52 31 55.6	6872	Druckfehler.
	205	e	6 17 15.33	+ 71	—	+ 2.1	51 52 14.4	6904	
164.	29	3	3 11 52.70	—	—	—	—	3724	
	142	—	—	—	—	—	52 17 16.4	4814	Druckfehler.
165.	8	—	1 2 55.43	—	—	—	—	1244	92.
	9	—	3 32.72	—	—	—	—	1266	92.
	40	4	23 39.57	+ 24	—	— 1.0	66 48 38.0	1677	
	90	2	2 1 30.14	— 33	—	— 0.3	66 56 49.9	2481	
	93	e	1 57.76	+118	—	— 4.6	66 29 0.0	2488	
166.	4	d	3 16 46.80	+ 65	—	— 2.1	60 52 50.4	—	Bemerkung recht.
	11	—	42 20.68	—	—	—	—	—	Bemerkung recht.
	31	—	55 40.50	—	—	—	—	—	93.
	45	—	4 7 36.59	—	—	—	—	4690	Bemerkung falsch.
	70	—	—	—	57 0.988	—10.5	62 6 5.8	4978	
167.	20	—	1 10 16.11	—	—	—	—	—	Bemerkung verfällt.
	21	—	14 39.13	—	—	—	—	1503	Reductionsfehler.
	43	—	33 28.22	— 62	—	— 3.8	70 47 18.7	2005	Reductionsfehler.
	50	—	41 22.87	—	37 2.460	— 2.5	70 57 2.6	—	Bemerkung recht.
	51	—	—	—	—	—	70 3 8.5	—	Reductionsfehler.
168.	7	—	1 7 21.42	+126	—	—	—	—	Reductionsfehler.
	95	e	2 11 52.22	+168	—	—12.6	73 51 53.6	—	Bemerkung recht.
	122	4	30 44.46	+ 28	—	— 1.7	70 58 48.4	3014	
	134	e	34 57.97	+147	—	— 4.2	72 14 59.3	—	
	138	—	40 9.00	—	—	—	—	—	Bemerkung verfällt.
	139	—	40 25.12	—	—	—	—	—	Bemerkung verfällt.
169.	6	—	6 22 33.40	—	—	—	—	6987	Druckfehler.
	21	—	34 22.22	—	65 —2.416	— 6.0	53 43 5.9	7196	
	53	d	51 44.08	+ 53	—	— 2.1	51 16 52.0	7474	
	65	—	—	—	—	—	50 48 50.3	7634	Reductionsfehler.
	87	—	7 14 36.06	—	62 1.000	—11.2	53 30 40.6	7865	Bemerkung recht.
	204	—	—	—	59 0.447	— 6.9	53 15 19.0	—	Bemerkung recht.
170.	3	—	4 57 5.17	+222	—	—13.2	79 2 17.1	5522	94.
	35	d	5 19 38.21	+127	—	— 1.3	74 29 21.7	5919	Bemerkung recht.
	65	4	45 36.34	+ 28	—	+ 3.4	74 22 44.9	6334	
	68	—	45 18.53	+166	14 —0.617	— 2.2	73 58 44.0	6323	95.
	69	2	50 8.20	— 51	—	+ 0.4	74 12 56.4	6406	
	87	2	6 3 22.64	— 50	—	— 8.5	77 32 16.8	6640	
171.	40	2	8 28 29.56	— 32	—	— 0.9	75 5 12.5	9133	
	54	—	40 12.08	—	—	—	—	—	Bemerkung verfällt.

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
171.	120	—	—	—	—	—	75 17 5.7	10086	Reductionsfehler.
	159	4	10 3 10.20	—	—	—	—	10607	
172.	2	—	—	—	69 3.676	—10.8	47 38 1.6	6123	96.
	63	—	6 5 43.06	— 33	—	— 3.0	46 4 35.2	6673	Reductionsfehler.
	84	—	16 4.15	— 20	—	— 4.1	46 9 21.2	6874	Reductionsfehler. 97.
	126	—	41 48.23	—	—	—	—	7291	
	127	—	42 36.59	—	—	—	—	7306	98.
173.	5	—	—	—	—	—	45 26 32.7	9200	Druckfehler.
	34	—	8 48 34.26	—	64 0.370	— 8.4	47 10 29.0	9466	
	35	—	51 14.20	— 21	—	+ 5.2	44 17 22.1	9500	Reductionsfehler.
	49	3.4	9 3 0.65	—	—	—	—	—	Bemerkung verfällt.
174.	14	—	5 55 59.59	—	—	—	—	6485	Reductionsfehler.
	39	—	6 13 10.66	—	—	—	—	6801	Bemerkung recht.
175.	10	—	6 2 21.52	—	—	—	—	—	Bemerkung recht.
	44	e	26 46.40	+106	—	— 9.3	66 19 41.7	6056	
	53	—	36 1.98	— 52	50 0.502	— 3.9	64 30 19.7	7220	
	70	—	46 45.09	— 60	—	—12.7	65 57 17.1	7395	Reductionsfehler.
	143	—	7 37 20.69	—	—	—	—	—	Bemerkung verfällt.
176.	130	—	11 5 37.04	+117	—	— 6.7	68 22 57.5	11571	Reductionsfehler.
	133	—	7 56.82	+119	—	—10.6	70 1 57.1	11611	Reductionsfehler.
	157	—	23 18.20	+160	—	— 8.5	69 52 59.1	—	Reductionsfehler.
	166	—	33 7.53	—	—	—	—	—	Bemerkung recht.
177.	71	—	6 58 31.54	—	39 5.110	— 3.7	47 7 25.9	7580	
	84	—	7 6 57.33	+ 56	55 0.387	— 2.8	48 23 45.3	7732	
	94	—	—	—	60 3.318	—	48 50 54.7	7856	
	165	—	—	—	41 3.058	— 2.9	47 15 50.5	8591	
	168	—	55 22.53	—	33 2.674	— 3.6	46 35 31.8	8578	
	169	—	56 53.84	—	—	—	—	—	Bemerkung recht.
	179	—	8 3 27.41	—	65 4.985	— 6.5	49 17 14.1	8729	
	187	—	6 33.46	—	46 —0.430	— 0.4	47 38 9.4	8787	
178.	55	—	—	—	—	—	48 51 43.1	11239	Druckfehler.
	69	—	—	—	58 —0.932	—10.5	48 38 25.6	11501	
	81	—	—	—	44 —3.300	+ 1.6	47 26 46.2	11701	99.
	100	—	—	—	44 0.325	— 1.2	47 29 34.1	11973	
	112	—	11 47 20.13	—	62 —3.598	— 5.6	51 52 34.9	—	Bemerkung recht.
179.	69	3.4	6 54 23.94	—	—	—	—	—	Bemerkung verfällt.
	80	—	7 1 36.97	—	—	—	—	—	Bemerkung verfällt.
180.	99	—	11 27 26.41	+ 76	38 —1.026	— 0.8	75 58 25.9	11897	
181.	55	—	7 6 38.21	—	76 —1.108	—11.0	74 7 56.9	7721	
	61	—	9 4.92	—	23 0.666	— 0.8	69 44 30.5	7769	Bemerkung recht.
	68	—	17 17.22	—120	35 3.998	— 6.3	70 47 1.8	7913	
182.	60	—	11 45 51.27	—	60 —2.820	— 7.1	72 47 10.4	12153	
	72	—	53 44.70	—	—	—	—	12248	100.
	98	—	12 12 44.70	—	—	—	—	12549	
	99	—	13 7.53	—	—	—	—	12554	
	100	—	15 41.05	—	—	—	—	12585	
	101	—	16 46.34	—	—	—	—	12600	
	102	—	18 12.28	—	—	—	—	12622	
	103	—	14 9.52	—	—	—	—	12565	
	104	—	14 53.28	—	—	—	—	12571	
	105	—	15 8.64	—	—	—	—	12575	
	121	—	32 11.98	—	62 —0.916	— 8.1	72 58 38.8	12840	
183.	82	—	8 23 32.00	—	—	—	—	9073	Reductionsfehler.
	120	—	—	—	—	—	61 49 8.0	9445	Reductionsfehler.
	153	—	9 12 43.88	—	32 —1.308	+ 1.8	59 59 15.4	9828	
184.	4	—	11 0 32.69	—	—	—	—	—	Reductionsfehler.
	30	—	15 50.21	—	—	—	—	11724	Reductionsfehler.
185.	15	—	—	—	—	—	66 52 14.4	8323	Druckfehler.
	97	—	—	—	—	—	66 6 53.4	—	Druckfehler.
	110	e	8 49 33.08	+135	—	—12.1	69 34 43.8	9483	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
185.	127	2	9 3 29.96	— 41	—	— 2.9	67 58 46.9	9702	
	148	—	17 19:	— 35	—	— 2.4	67 50 55.4	9890	101.
186.	58	5	11 48 44.48	+ 35	—	—	—	12192	
187.	6	—	7 49 29.55	—	—	—	—	8483	102.
	36	—	8 10 53.20	—	—	—	—	8863	103.
	49	—	—	—	73 1.748	— 8.3	66 25 53.9	9064	
	86	—	49 48.50	—	—	—	—	9481	Reductionsfehler.
	93	—	—	—	63 2.101	— 9.5	65 36 9.2	9538	
	109	—	9 7 21.65	— 35	—	— 5.8	64 51 14.2	9760	104.
	118	—	—	—	56 1.400	— 11.8	65 0 34.0	9846	
188.	5	—	8 2 22.88	—	63 —1.479	— 7.2	59 32 53.3	8699	Bemerkung recht.
	17	—	10 3.53	— 46	—	— 2.3	57 19 30.4	8847	Reductionsfehler.
	53	—	29 48.23	—	—	—	—	—	Bemerkung verfällt. 105.
	70	—	41 39.62	—	62 —1.349	— 7.9	59 27 58.7	9359	
	125	—	9 25 40.71	—	40 0.790	— 0.7	57 39 46.4	10028	
189.	4	—	11 23 32.47	—	71 —1.730	— 8.4	69 41 25.3	11835	
	24	—	—	—	—	—	67 43 35.8	12029	Druckfehler.
	33	—	46 12.84	—	27 3.051	— 6.0	66 5 12.4	—	Bemerkung recht.
	80	—	12 24 52.01	—	—	—	—	12720	106.
	81	—	25 6.02	—	—	—	—	12724	106.
	82	—	24 12.62	—	—	—	—	12709	106.
190.	23	—	—	—	60 —0.712	— 9.1	50 50 27.4	9844	
	70	—	9 43 54.18	— 23	—	— 9.5	51 25 35.4	10316	Reductionsfehler.
	104	—	—	—	—	—	50 32 29.2	—	Druckfehler.
191.	4	—	12 2 39.16	—	42 3.703	—	49 23 59.6	12403	
	118	—	13 20 0.82	—	67 0.904	—10.4	51 26 42.2	13632	
	119	—	20 41.52	—	68 0.500	—10.6	51 31 22.9	13637	
192.	3	—	12 3 38.38	—	67 3.668	—11.9	47 28 19.0	—	Bemerkung recht.
	124	—	—	—	—	—	45 48 57.6	—	Reductionsfehler.
193.	42	—	13 1 33.73	—	39 —2.943	+ 1.9	63 31 34.6	13354	
	66	—	20 10.97	—	45 —0.010	— 0.8	64 3 48.7	13639	
	77	—	28 13.53	—	36 0.800	— 1.1	63 19 26.2	13790	
	128	—	—	—	42 —1.009	—	63 48 1.7	—	Bemerkung verfällt.
194.	41	—	14 13 10.84	—	—	—	—	—	Bemerkung verfällt.
	69	—	41 12.88	—131	—	— 9.5	79 41 57.1	14863	Reductionsfehler.
	82	—	—	—	—	—	78 47 53.3	15047	Druckfehler.
195.	36	—	—	—	—	—	73 45 55.1	9987	Druckfehler.
	39	—	—	—	—	—	73 12 7.1	—	Druckfehler.
	41	—	9 31 0.00	—	—	—	—	10143	Druckfehler.
	97	2	10 23 15.80	— 51	—	— 1.2	69 39 25.8	10921	
	131	—	51 27.81	—	26 5.688	— 4.1	70 3 13.8	11314	
	137	—	—	—	—	—	72 19 58.2	—	Druckfehler.
196.	60	—	11 7 53.77	+ 80	—	— 5.0	50 19 25.1	11621	Reductionsfehler.
	73	—	—	—	—	—	51 20 57.2	—	Druckfehler.
	104	—	—	—	43 —0.496	— 0.4	49 23 11.3	12081	
	128	—	59 6.73	—	43 1.075	— 1.3	49 24 24.3	12345	
	134	—	12 2 20.91	—	43 0.235	— 0.5	49 23 45.6	12402	
197.	25	—	12 15 38.54	—	—	—	—	12584	Reductionsfehler.
	58	4	36 29.32	—	—	—	—	13945	
	93	—	13 7 47.19	—158	—	— 5.0	76 24 22.7	13438	Reductionsfehler.
	99	—	10 45.50	— 73	—	— 2.9	75 10 24.2	13494	107.
	100	—	11 20.25	— 71	—	— 2.3	74 4 25.8	13508	
	101	—	10 45.00	—	—	— 1.6	75 10 25.0	13490	
	102	—	9 13.89	+152	—	— 3.6	73 36 52.8	13471	
	103	—	13 57.08	— 62	—	— 2.7	74 6 17.7	13550	
	104	—	11 1.68	+148	—	— 5.4	74 55 37.4	13499	
	105	—	12 25.11	+ 88	—	— 4.0	74 56 10.4	13525	
	106	—	16 53.73	— 59	—	— 9.2	78 37 55.3	13592	
	107	—	18 18.25	—107	—	— 7.4	79 7 22.6	13611	
	108	—	13 2.73	+235	—	—12.6	79 30 39.4	13527	

Zone	No.	Fad.	Beob. Durchg.	Stw.	Microscop	Corr.	Beob. Decl.	Öltzen	Anmerkungen
			u ′ ″	″		″	° ′ ″		
197.	109	—	13 18 42.30	—	—	— 2.3	75 20 38.5	13615	
	110	—	21 52.12	—153	—	— 5.9	74 59 39.2	13661	
	111	—	22 34.00	—134	—	— 3.6	73 2 38.1	13677	
	112	—	21 51.61	— 73	—	— 2.7	73 4 21.8	13657	
	113	—	22 19.65	— 69	—	— 3.0	73 11 24.2	13671	
	114	—	22 15.64	— 30	—	— 2.3	74 16 36.7	13668	
	115	—	24 20.58	—136	—	— 5.3	74 20 29.7	13707	
	116	—	23 41.97	— 57	—	— 1.6	75 2 53.0	13695	
	117	—	22 41.78	+ 68	—	— 9.2	76 46 50.5	13676	
	118	—	24 41.30	—	—	—10.5	76 59 3.2	13706	
	119	—	21 53.15	+178	—	—10.2	77 5 35.5	13653	
	120	—	24 27.76	+ 72	—	—11.6	78 31 2.1	13700	
	121	—	26 37.27	—	—	— 8.1	79 29 49.7	13739	
	122	—	25 52.42	+104	—	— 9.2	79 26 8.4	13723	
	123	—	27 7.93	+ 77	—	— 2.6	76 23 29.6	13749	
	124	—	27 24.82	+ 77	—	— 3.4	76 24 37.7	13755	
	125	—	30 35.78	— 86	—	—13.7	76 51 0.0	13814	
	126	—	26 49.53	+180	—	— 4.7	75 40 22.3	13742	
	127	—	28 11.82	+139	—	— 5.3	74 45 32.9	13772	
	128	—	32 23.78	— 70	—	— 1.0	73 25 16.4	13839	
	129	—	29 47.84	+116	—	— 1.8	73 50 27.7	13801	
	130	—	32 2.18	+ 80	—	— 7.6	77 4 49.4	13832	
	131	—	32 53.52	+ 64	—	— 9.6	77 19 48.8	13845	
	132	—	34 27.86	+ 28	—	— 5.3	76 41 43.1	13873	
	133	—	36 48.63	— 89	—	—13.9	76 51 3.6	13910	
	134	—	37 26.10	— 86	—	— 1.9	75 52 54.8	13925	
	135	—	36 5.79	+ 33	—	— 2.3	75 5 19.2	13902	
	136	—	37 26.19	—	—	— 0.2	75 52 58.7	13921	
198.	15	—	—	—	43 4.262	—	47 27 53.7	—	Bemerkung verfällt.
	30	—	12 19 39.15	—	53 5.418	— 4.5	48 18 45.4	12652	108.
199.	33	—	—	—	—	—	59 47 0.1	—	Reductionsfehler.
	34	—	—	—	—	—	59 47 30.9	—	Reductionsfehler.
	39	—	11 36 52.80	—	—	—	—	12034	Reductionsfehler.
200.	22	—	12 37 27.75	—	—	—	—	12944	
	23	—	38 10.03	—	—	—	—	12957	
	91	—	13 24 16.23	—	42 1.308	— 5.5	71 19 21.0	—	Bemerkung recht.
	103	—	27 45.47	+154	—	—14.6	72 30 36.5	13780	Reductionsfehler.
	127	—	53 3.59	—	71 5.957	— 9.6	73 47 55.7	14153	
	142	—	14 0 12.67	—	35 3.243	— 4.3	70 45 53.3	—	Bemerkung verfällt.
201.	35	—	12 55 35.47	—	—	—	—	13260	Schreibfehler.
	40	—	59 41.22	—	78 2.640	—10.1	57 51 19.4	13321	
	41	—	13 2 32.00	—	—	—	—	13360	Druckfehler.
	99	—	—	—	42 1.144	— 2.0	54 50 16.9	14010	
202.	1	d	12 57 41.14	+ 63	—	— 7.6	53 17 12.9	13304	
	47	—	13 35 20.91	—	—	—	—	13905	
	48	—	36 3.87	—	—	—	—	13915	
	67	—	—	—	35 3.230	— 2.6	51 17 44.4	—	
	82	—	—	—	54 —0.476	— 4.6	52 49 48.0	14348	
203.	27	—	—	—	28 —0.664	+ 0.1	59 39 48.9	13095	
	28	—	—	—	31 —0.974	— 2.6	59 54 31.6	—	
	65	—	13 21 28.29	— 37	64 —0.105	— 9.0	62 40 6.1	13642	
	69	—	—	—	—	—	60 48 1.3	13692	Druckfehler.
	83	—	34 7.42	—	—	—	—	13861	
	112	—	—	—	47 3.588	— 3.9	61 18 4.9	14256	109.
	121	f	14 5 6.47	+105	—	— 1.3	59 53 5.4	14353	
	127	—	11 36.71	—	43 2.172	— 2.8	60 56 59.4	14438	
204.	119	—	14 32 36.65	—	—	—	—	14742	

Nachtrag.

Bei dem Sterne Z. 50 Nro. 149 ist angegeben, dass die Fäden 52″.87 und 52″.14 geben, und dass ich den letzteren um +1″ corrigirt habe. Diese Correction haben eine Wiener und eine Bonner Meridianbeobachtung als unrichtig erwiesen; das uncorrigirte Mittel stimmt nahe mit den erwähnten Beobachtungen, und beide Fäden sind also wohl nach entgegengesetzten Seiten fehlerhaft. Im Texte muss also die Durchgangszeit statt 1ᵘ 7′ 53″.00 heissen 1ᵘ 7′ 52″.50. Der Stern ist Oeltzen Nro. 1336.

Anmerkungen zu dem vorstehenden Fehlerverzeichniss.

1. Fad. c ist im Original sehr undeutlich; er wurde 52″.8 gelesen und danach Fad. 5 um —4″ corrigirt. Eine Bonner Meridianbeobachtung zeigt aber, dass Fad. 5 richtig ist, und c 56″.8 gelesen werden muss. Auch die Minute ist falsch, und muss 34′ sein.
2. Diese 4 Sterne sind im Originale eingeklammert, und beim letzten ist beigeschrieben »2 Fäden weiter«. Die Klammer ist aber bei der Reduction übersehen worden. Bei Nro. 68 muss man aber 4 Fäden weiter lesen, also statt der ursprünglich angegebenen 3.5 nicht, wie der Text hat, 5.d, sondern d.f. Dass Herr Oeltzen nach einer Beobachtung am Wiener Meridiankreise die AR. des letzten Sterns für richtig hielt, rührt wohl daher, dass er sie durch Differenz mit einer der vorhergehenden selbst unrichtigeu ermittelte.
3. Die Fäden geben 38″.41 und 39″.29; der 2te ward bei der Reduction als richtig angenommen und danach der erste um +1″ corrigirt, während er richtig, und der 2te um —1″ zu corrigiren ist.
4. Die Fäden geben 4″.54 und 3″.60; ich hatte den letztern als richtig angenommen, und den erstern um —1″ corrigirt, während nach einer Bonner Meridianbeobachtung das Mittel das Richtige ist.
5. Fad. e im Original 45″, was für 4″.5 gelesen wurde.
6. Die Fäden geben 10″.06 und 9″.77, und bei beiden ist die Secunde als zweifelhaft bezeichnet, wesshalb ich noch den 3ten beobachtete, aber da er mit einem ? bezeichnet ist, wohl nur flüchtig. Er giebt 10″.50, und ich hatte daher bei der Reduction ihn selbst zwar ausgeschlossen, die beiden andern aber um +1″ corrigirt. Die Correctur ist nach einer Bonner Meridianbeobachtung wohl richtig, und die Bemerkung verfällt daher.
7. Diese beiden Sterne sind im Original so eingetragen: Nro. 33 an Fad. e um 6′ 51″.6, Nro. 34 an Fad. 4 um 6′ 36″.5, an Fad. 5 um ″.7 ohne Secunde; es muss aber heissen: Nro. 33 Fad. e ″.7, Nro. 34 Fad. 5 6′ 51″.6, und die ausgelassene Secunde von Nro. 33 muss nach Z. 128 Nro. 2 und einer Wiener Meridianbeobachtung 0 sein.
8. Der Himmel zeigt noch einen andern Stern 9ᵐ., dessen AR. zu der Zone passt, derselbe ist aber 18′.4 südlicher als Nro. 67, und die in der Note gemachte und hier wieder adoptirte Annahme über die Declination ist daher viel wahrscheinlicher.
9. Nach Grombridge, Johnson und einer Bonner Meridianbeobachtung ist das Mittel aus den beiden uncorrigirten Fäden das Richtige. Beide sind also wohl schlecht beobachtet.
10. Nach Herrn Oeltzen (Zusätze und Verbesserungen zu den Argelanderschen Zonen, Wiener Annalen 3te F· ·26
zu Nro. 20868) ist Nro. 152 ohne Decl. und die im Texte zu dieser Nummer gesetzte Decl. geh
wird dieses nicht nur durch Struves positiones mediae bestätigt, sondern auch durch Heliometerme
die reducirt auf 1855 die Position von Nro. 152 ergeben = Nro. 151 +5″.45 & —1′ 21
—23″.71 & —0′ 32″.93, also Position 1855 20ʰ 33′ 57″.52 +61° 55′ 35″.1.
11. Der Stern ist offenbar identisch mit Fedorenko Nro. 3738 und einem Sterne 8.9ᵐ, den ic
beobachtet habe. Um aber Uebereinstimmung zu erhalten, muss man Fedorenko's Decl.

AR. um 0″.34, die AR. von Z. 32 Nro. 9 um 30″ vergrössern. Dann erhält man sehr gute Uebereinstimmung unter Annahme einer jährlichen EB. von —0″.077 und —0″.37. An der Richtigkeit der gemachten Correction ist nicht zu zweifeln.

12. Fad. e war ursprünglich wirklich 2′ 54″.9 eingetragen, dann aber in 3′ 4″.9 geändert worden, wahrscheinlich weil ich einen Fehler von 10″ entdeckt hatte. Dieser muss aber erst nach der Beobachtung des Fadens gemacht sein.

13. Die Beobachtung weicht in Decl. +11″.6 von Z. 14 Nro. 55 und 9″ nach derselben Seite von einer Bonner Meridianbeobachtung ab. Da nun bei dem vorhergehenden Sterne das Microscop auf der negativen Seite eingestellt, also nach der der gewöhnlichen Richtung entgegengesetzten abgelesen war; so ist die Annahme, dass auch bei unserm Sterne nach derselben, hier unrichtigen Richtung abgelesen worden, mir sehr plausibel, obgleich sonst ein derartiger Fehler bei Kysaeus nicht leicht vorgekommen ist. Jedenfalls ist diese Annahme viel wahrscheinlicher, als die eines Ablese- oder Schreibfehlers von 0R.2.

14. Die Zeit an Fad. 5 ist richtig 51′ 27″.5 eingetragen, so dass der Durchgang richtig 22ᵘ 50′ 40″.97 wird. Er ist also vor dem vorhergehenden Sterne beobachtet worden. Dass er nach demselben eingetragen ist, rührt wohl daher, dass ich Nro. 29 an einem frühern Faden hatte beobachten wollen, und desshalb die Decl. vor der von Nro. 30 einstellte.

15. Im Original ist in der Columne für die Grössen 6 und 9 über einander geschrieben, ohne dass sich entscheiden lässt, welche Zahl die später geschriebene ist. Der Stern ist aber nach 4 Schätzungen der Durchmusterung und einer Wiener Meridianbeobachtung 9^m.

16. Im Original ist der Faden nicht angegeben; es muss e, nicht wie früher angenommen, d gewesen sein.

17. Die in der Bemerkung gehegte Vermuthung einer Fadenverwechselung wurde nur gehegt, weil ich fälschlich angenommen hatte, dass beim vorhergehenden Sterne der Faden d in e zu verwandeln sei. Das Original giebt keine Anleitung zu einer solchen Vermuthung.

18. Ich habe jetzt nach einer Wiener und einer Bonner Meridianbeobachtung angenommen, dass Fad. 3 der falsche, Fad. 4 der richtige sei. Vielleicht sind sie aber beide schlecht beobachtet.

19. Wahrscheinlicher wohl Fehler in der für den Setzer bestimmten Abschrift. Hiernach die Angabe im Fehlerverzeichniss p. 495 zu verbessern.

20. Das Original hat an Fad. e 48′ 18″.5 an Fad. f ″.8 ohne Angabe der Secunde; da aber um 48′ 18″ auch die Decl. eingestellt ist, so ist es mir wahrscheinlich, dass ich diese eben ausgerufene Secunde statt der wirklich beobachteten auch in die Columne für das Fadenintervall eingetragen, und nun bei Fad. f, weil das Intervall nicht stimmte, die Secunde fortgelassen habe. Ich lese die ganze Secunde nach einer Bonner Meridianbeobachtung 13″.

21. Die AR. ist fehlerhaft, und nach Lalande und 2 Bonner Meridianbeobachtungen 2″.5 zu gross. Es ist derselbe Fehler wie bei der vorigen Note, indem die für die Einstellung der Decl. ausgerufene Zahl 19″ auch für den Faden angesetzt wurde.

22. Obgleich das Original bei diesen 3 Sternen keine Veranlassung zur Annahme von Fehlern in der Zeit giebt, so habe ich nach Vergleichung andrer Zonen und neuerer Beobachtungen doch keinen Anstand genommen, die Durchgangszeiten auf die angegebene Weise zu corrigiren, da die Correction bei allen drei Sternen sich als nöthig herausstellt. Ich vermuthe, dass ich eine schon bei Nro. 56 begangene Verzählung von 1″ erst bei Nro. 57 bemerkt, aber nach der verkehrten Seite corrigirt habe, welcher Fehler von 2″ sich dann auch auf Nro. 58 fortgepflanzt hat.

23. Im Original fehlt die Angabe des Fadens; ich hatte d angenommen, weil der vorige Stern an d beobachtet war; es ist aber f gewesen, und der Stern identisch mit Nro. 57.

24. Im Original Fad. d 38″.7 e 48″.9, Einstellung der Decl. 49″. Beide Fäden sind fehlerhaft; wahrscheinlich ist der Stern sehr schwach gewesen, da auch die Decl. schlecht ist. Nach einer Bonner Meridianbeobachtung hätte der Durchgang um 23ᵘ 39′ 41″.16 gefunden werden müssen bei einer Decl. von +46° 12′ 53″.2.

25. Der Reductionsfehler von 1′ in der Decl. ist bei allen diesen Sternen von Oeltzen schon nach dem Fehlerverzeichniss corrigirt, aber die dadurch nöthig gewordene kleine Aenderung in der Durchgangszeit nicht berücksichtigt, und daher in seinem Cataloge noch anzubringen.

26. Das Original hat richtig Fad. c in der für die mit Buchstaben bezeichneten Fäden bestimmten Columne; das c ist aber etwas undeutlich und kann auch 5 gelesen werden, welche Lesart ich unbegreiflicherweise bei der Reduction angenommen hatte.

27. Im Original ist in die Zeile für Nro. 82 eingetragen Fad. c 18′ 6″.7 Fad. 1 44″.6, in die für Nro. 83 Fad. 1 18′ 42″.6. Da nun die Fäden nicht stimmten, hatte ich eine Verwechselung der Durchgangszeiten an Fad. 1 angenommen; Bonner Meridianbeobachtungen zeigen aber, dass die Fäden 1 richtig sind, aber Fad. c in die falsche Zeile geschrieben ist, und zu Nro. 83 gehört. Beider Sterne ARnen sind aber etwa 1″ zu gross, oder sollten die Sterne EB. haben?
28. Die Zeitminute im Original nicht angegeben.
29. Auch im Original wirklich Fad. a, aber der letzte Strich so hoch hinaufgezogen, dass der Buchstabe ohne schärfere Betrachtung leicht für d zu lesen ist, und so gelesen wurde.
30. Im Original deutlich 52′ 41″.1 an Fad. 5; aber nach dem übereinstimmenden Zeugniss aller andern Beobachtungen verschrieben für 52′ 48″.1.
31. Bei beiden Sternen die Zeitminute im Original allerdings 27′, aber, wie die Folge der Zeiten und die Durchmusterung zeigen, offenbar verschrieben statt 26′.
32. Im Original bei beiden Sternen die richtige Zeitminute, aber bei der Reduction fälschlich um +1′ corrigirt, weil übersehn war, dass Faden 5 von Nro. 65, um einen Zweifel in der Secunde zu lösen, nach Nro. 66 beobachtet worden war.
33. Die Zeit ist im Original mit einem ? bezeichnet, nicht mit dem bestimmten Zweifelszeichen : ; nach einer Bonner Meridianbeobachtung ist sie richtig.
34. Auch im Original wirklich Fad. d, aber der letzte Strich so kurz ausgezogen, dass der Buchstabe ohne schärfere Betrachtung leicht für a zu lesen ist, und so gelesen wurde.
35. Dieser eigenthümliche Reductionsfehler ist dadurch entstanden, dass die Decl. schon früher einmal eingestellt und die Zeit der Einstellung aufgeschrieben worden war. Diese Einstellung ist aber wohl schlecht gewesen, und ward daher um 21′ 31″ eine neue gemacht, und die Zahl der frühern ausgestrichen. Die neue Einstellungszahl 31″ war nun in die Columne für die Zahl der Striche gesetzt worden und ward bei der Reduction der Decl. für die letztere genommen, bei der Angabe des Stundenwinkels aber ganz übersehn.
36. Der Zweifel bei diesen beiden Sternen war dadurch entstanden, dass ich Fad. 4 von Nro. 129, der 25′ ″.8 ohne Angabe der Secunde eingetragen ist, für 25″.8 gelesen hatte; die ausgelassene Secunde ist 10″ und die Angabe des Textes bei beiden Sternen richtig.
37. Im Original ist allerdings Fad. d von Nro. 127 als um 19′ 1″.8 beobachtet angegeben. Da aber die Decl. des vorhergehenden um 1° nördlichern Sterns um 19′ 9″ eingestellt ward, muss die Minute nothwendig 20′ sein. Dieser Fehler hatte sich auch auf die 4 folgenden Sterne fortgepflanzt, ward bei dem letzten von diesen, Nro. 131, bemerkt und corrigirt, aber nicht bei den vorhergehenden, wie es hätte geschehen sollen.
38. Beobachtet an Fad. d um 59′ 14″.9, an Fad. e um 59′ 30″.4. Bei dem letztern hatte ich einen Fehler von 1″ bemerkt, daher noch im Original 30″.4 in 29″.4 verwandelt und beigeschrieben Sec. zweifelhaft. Bei der Reduction hatte ich, um Uebereinstimmung zwischen den Fäden zu bewirken, Fad. e noch um 1″ verkleinert. Nach zwei Bonner Meridianbeobachtungen zeigt sich aber, dass ich 30″.4 nicht in 29″.4 hätte corrigiren sollen, sondern umgekehrt Fad. d in 16″.9. Das ist jetzt geschehn. LL. Nro. 15812 giebt die AR. noch um 1″ grösser und ist wohl fehlerhaft, oder es findet eine kleine EB. statt.
39. Nach einer Bonner Meridianbeobachtung ist Fad. 5 richtig, Fad. 4 um 1″ verzählt; ich habe diesen daher jetzt um 1″ vermehrt, und dann das Mittel genommen.
40. Nach Z. 171 Nro. 68 und einer Bonner Meridianbeobachtung ist Fad. 3 richtig, Fad. 2 um 1″ verzählt; ich habe diesen daher jetzt um 1″ vermehrt, und dann das Mittel genommen.
41. Obgleich das Original keine Veranlassung zu dieser Correction von +1″ giebt, so habe ich doch keinen Anstand genommen, sie zu machen, da der Himmel sie bei allen vier Sternen fordert.
42. Im Original ist bei Fad. b die Secunde als zweifelhaft angegeben; ich hatte diese daher so wie die nur 4″ vorher ausgerufene Zeit der Einstellung der Decl. um —20″ corrigirt, um sie mit Fad. 2 in Uebereinstimmung zu bringen. Der Himmel zeigt aber, dass Fad. b richtig und statt Fad. 2 zu lesen ist Fad. 1.
43. Die Zeit an Fad. 1 ist 5″.9 gelesen worden; ich glaube aber nach genauerer Betrachtung der Zahl, dass sie 5′ ″.9 mit fehlender Secunde zu lesen sei; jedoch bleibt ungewiss, ob 7″ oder 8″ zu suppliren sei, da alle Beobachtungen mit sehr guter Uebereinstimmung eine um 2″.5 grössere Durchgangszeit haben, als die im Texte angesetzte.
44. Im Originale alle 3 Sterne ohne Angabe der Zeitminute, und diese im Texte falsch supplirt.
45. Der Fehler von —1″, der bei Nro. 96 vermuthet ward, und auch wirklich statt gefunden hat, ist nach Lalande Fedorenko und Bonner Meridianbeobachtungen schon bei diesen beiden Sternen begangen worden; Nro. 93 ist noch ri-

46. In der Anmerkung zu diesem Sterne muss es heissen »Minute vielleicht 39′«, und dies ist das Rechte.

47. Im Original Fad. f 28′ 46″, was die corrigirte Durchgangszeit giebt; der Haken durch die 6 war aber so weit heraus gezogen, dass er bei flüchtigem Zusehn mit einem Puncte verwechselt, und daher 4″.6 gelesen werden konnte, was die Durchgangszeit des Textes giebt. Diese Leseart ist übrigens an sich schon unmöglich, da der vorhergehende Stern an Fad. 5 um 28′ 5″ beobachtet worden war.

48. Der den Faden bezeichnende Buchstabe ist im Originale undeutlich, und eher b als f zu lesen; da indess nur 9″.6 früher der vorhergehende Stern an Fad. e beobachtet wurde, und b und e zusammen im Felde des gebrauchten Oculars nicht zu sehn sind, so ist es nicht zweifelhaft, dass f die richtige Leseart ist. Auch findet sich am Himmel nur ein dieser Leseart entsprechender Stern.

49. Ein Fehler von +1″, der bei Nro. 17 entdeckt und verbessert ward, hat nach dem Zeugniss andrer Zonen und neuer Beobachtungen schon bei den Nro. 12 bis 16 statt gefunden. Nro. 11 ist noch richtig, wonach die Bemerkung bei Oeltzen zu berichtigen ist.

50. Der bei Fad. 1 des folgenden Sterns nach der Note zu demselben corrigirte Fehler von 1″ hat nach dem Zeugniss des Himmels schon bei unserm Sterne stattgefunden.

51. Das Original hat an Fad. 5 29′ 1″.2, was, da der Punct zwischen 1 und 2 sehr schwach, und die Zahlen nahe bei einander stehn, für 29′ 12″ fälschlich gelesen ward.

52. Die Fäden müssen e.f sein; sie geben dann für den Durchgang 2″.36 und 3″.38. Da der erstere mit einem ? bezeichnet ist, habe ich ihn um +1″ corrigirt. Vielleicht ist aber auch dieser richtig und f falsch, was viel besser mit 2 Bonner Meridianbeobachtungen stimmen würde.

53. Ich kann keinen Stern finden, der mit der angegebenen Decl. passt; lese ich aber den Strich des Microscops 64 statt 59, und die Decl. wie angegeben, so passt dies vortefflich mit einem am Bonner Meridiankreise beobachteten Sterne.

54. So auffallend es ist, unter der ganzen Reihe Fehler von 2″ einen solchen von nur einer Secunde zu finden, so fordern doch alle Positionen dieses vielfach bestimmten Sterns eine solche Correction, und die Fäden stimmen sehr gut zusammen. Ich habe schon am Schlusse der Zone bemerkt, wie aus den vielen Verzählungen, die in derselben sich vorfinden, auf heftigen Wind zu schliessen sei, der die Secunden oft nicht deutlich hören liess.

55. Hier zeigt sich wieder dieselbe Erscheinung, wie bei der vorigen Note: die Fäden stimmen ganz gut zusammen, und doch geben eine Rümkersche und zwei Bonner Meridianbeobachtungen die Correction nur 1″. Die uncorrigirte Decl. des Textes 60° 42′ 22″.8 ist ein Reductionsfehler statt 60° 42′ 2″.8.

56. Im Texte ist hier in den Secunden des Durchganges ein Druckfehler: statt 29″.72 sollen sie 59″.72 sein. Ausserdem ist aber noch ein Beobachtungsfehler von 1″ begangen, woraus sich die corrigirte Durchgangszeit zusammensetzt.

57. Hier ist wieder dieselbe Erscheinung wie bei Note 54.

58. Diese Beobachtung scheint ganz roh zu sein, auch die Decl. ist schlecht.

59. Beider Sterne Durchgangszeiten sind im Original um —20″ corrigirt; neuere Beobachtungen zeigen aber, dass die Corr. —30″ ist. Ausserdem ist die AR. von Nro. 67 durch einen Reductionsfehler im Texte um 1′ zu klein angesetzt.

60. Die Decl. ist nach dem übereinstimmenden Zeugniss von Fedorenko, Johnson und einer Bonner Meridianbeobachtung 1′ 20″ oder $1^{R}.7$ zu klein, und ich vermag eben so wenig eine Erklärung dieses eigenthümlichen Fehlers als einen andern Stern aufzufinden, mit dem sich die Beobachtung auf eine andre Art identificiren liesse. Auch die Grösse ist bedeutend zu stark. Die Durchgangszeit ist der richtigen Decl. gemäss corrigirt.

61. Fad. f im Original ursprünglich 50′ 9″.7, was die verbesserte Durchgangszeit ergiebt; erst später ist —2″ wie bei dem folgenden Sterne hinzugeschrieben, wohl weil ich irrthümlich vermuthete, dass der bei dem folgenden Sterne entdeckte Fehler schon hier stattgefunden habe.

62. Die falsche Angabe des Microscops im Texte ist ein Druckfehler; der Fad. ist im Original schon mit einem Fragezeichen versehn; es war nicht d, sondern f.

63. Ein Fehler von +1″, der beim folgenden Sterne entdeckt und verbessert wurde, hat nach dem Zeugniss von Bessel und einer Bonner Meridianbeobachtung schon hier statt gefunden. Bei Nro. 40 ist die Secunde noch richtig.

64. Es ist kein andrer Stern in dieser Gegend, der zu der beobachteten Decl. passte, als Z. 115 Nro. 71, mit dem ich ihn durch Beischreibung der ungefähren Durchgangszeit identificirt habe. Dieser Stern ist freilich bedeutend heller, aber die Grösse 10^{m}. ist auch nicht beobachtet, sondern mit Tinte später aus vager Erinnerung beigeschrieben.

65. Faden 1 im Original 51′ 41″.8, aber da der Haken der 8 rückwärts durch die 1 gezogen ist, bei der Reduction fälschlich 51′ 47″.8 gelesen. Die Zeitminute ist falsch, und muss wie bei den folgenden 2 Sternen um 1′ vermehrt werden.

66. Die beobachtete Zeit ist im Original richtig in die Columne für Fad. 1 eingetragen, und erst später irrthümlich ein d beigeschrieben.

67. Die 6 in der ersten Decimale des Microscops ist im Originale etwas undeutlich, und war desshalb irrthümlich 0 gelesen worden.

68. Bei den beiden folgenden Sternen ward ein Fehler von +30″ in der Zeit entdeckt und verbessert; schon aus der Folge der Zeiten geht hervor, dass derselbe Fehler bereits auch bei unserm Sterne stattgefunden haben musste, und der Himmel bestätigt es.

69. Ein Fehler von 1″, der bei diesem Sterne entdeckt wurde, ist nach dem Zeugniss von Bessels Zone 419 und einer Bonner Meridianbeobachtung nach der verkehrten Seite verbessert worden.

70. Dieser Stern ist zwischen den Fäden des vorigen beobachtet worden, und die Beobachtungszeit an Fad. 5 zu 30′ 42″.6 angegeben; dies muss aber eine bare Verschreibung sein, da der vorhergehende Stern an Fad. e um 30′ 42″.5 beobachtet ist; doch glaube ich das Zehntel für richtig halten zu dürfen, und die Secunde habe ich nach Z. 144 Nro. 39 und einer Bonner Meridianbeobachtung zu 55″ angenommen. Die Aenderung in der Correction der Decl. rührt zum Theil von einem Reductionsfehler her.

71. Die Zeitminute ist bei diesen 7 Sternen im Original nicht angegeben, und bei der Reduction falsch angenommen.

72. Im Original Fad. 1 und 4. Da dies mit dem beobachteten Zeitunterschiede nicht stimmte, hatte ich statt des ersten den 2ten Faden genommen; der Himmel zeigt aber, dass Fad. 1 richtig und statt des 4ten der 3te zu nehmen ist.

73. Fad. 3 im Original 53′ 6″.4, bei der Reduction fälschlich in 7″.4 geändert, weil bei dem 3ten Faden des folgenden Sterns ein Fehler von —1″ entdeckt und verbessert worden war, aber mit Unrecht, wie die Beobachtungen von Lalande bei Fedorenko, Schwerd und 3 Bonner zeigen. Der Stern hat starke EB. von +1″.5 im Bogen und +0″.55 jährlich.

74. Im Original ist die Minute bei Nro. 138 richtig angegeben, nämlich 45′ 50″.5 an Fad. 2. Sie wurde bei diesem so wie den folgenden 5 Sternen nach Grombridges Position von Nro. 142 geändert. Diese (Gr. Nro. 3602) ist aber selbst um 1′ falsch, wahrscheinlich durch einen Druckfehler.

75. Ursprünglich wirklich als Fad. 2 eingetragen, dann aber fälschlich in Fad. 3 geändert.

76. Fad. 2 im Original 35′ 23″ +2″. Diese Corr. von +2″ ist an sich schon sehr auffallend, da der kurz vorher beobachtete Fad. c von Nro. 6, bei dem die Secunde zweifelhaft war, nach dem Zeugniss des 3ten Fadens, so wie von Grombridge und Johnson nur um +1″ zu corrigiren ist; und ausserdem zeigen Rümker und eine Bonner Meridianbeobachtung, dass auch bei unserm Sterne die Corr. nur +1″ beträgt.

77. Ich habe nicht angestanden, die Decl. um +10 Striche zu corrigiren, wodurch die Position mit Rümker Nro. 10340 vollkommen übereinkommt. Zwar findet sich an der Stelle der uncorrigirten Position ein Sternchen 10^m., dessen Decl. fast vollkommen mit der des Textes übereinstimmt; aber einmal ist seine AR. nahe 2″ in Zeit grösser, als die jenes, und dann müsste der Stern auch veränderlich sein. Er ist aber nie heller gesehn worden, er fehlt in allen 3 Zonen der Durchmusterung, war 1859 Nov. 11, 1862 Jan. 6 und Sept. 15 nur 10^m. und ward 1860 Nov. 16 bei etwas dunstiger Luft im Meridiankreise nicht gesehn.

78. Fad. 5 im Original 41′ 3″.6, was bei der Reduction irrthümlich für 41′ 36″ gelesen wurde.

79. Es ist schon in den Bemerkungen zu Nro. 44 erwähnt, dass die Fäden schlecht stimmen; neuere Beobachtungen haben nun gezeigt, dass Fad. 3 um +1″ verzählt ist, und 52″.3 heissen muss; dieser Fehler hat sich nun bis zu Nro. 52 fortgepflanzt, ist bei diesem Sterne entdeckt, aber nach der falschen Seite corrigirt worden. Ausserdem gehört die bei Nro. 47 angesetzte Decl. zu Nro. 46, und Nro. 47 ist ohne Decl., aber offenbar derselbe Stern mit Nro. 48 und 43; es sind die beiden Fäden nur aus Versehn in 2 verschiedene Reihen geschrieben worden, und fehlt also keine Declination; auch ist die Grösse von Nro. 48 entweder ausgestrichen, oder sie ist ursprünglich 8^m. gewesen; der Stern ist wirklich schwach 8^m.

80. Im Original ursprünglich Fad. c.e, was ich für eine Verschreibung statt d.e gehalten hatte; es ist aber verschrieben für b.c. Dass es frühe Fäden gewesen, geht schon daraus hervor, dass der vorhergehende Stern nur 9″ vor dem erstern Faden in der Gegend von Fad. 1 für Decl. eingestellt, und 5″ nach ihm an Fad. 2 beobachtet worden ist.

81. Die Vermuthung der Bemerkung ist also für diesen Stern begründet; die Durchgangszeiten der vorhergehenden aber noch richtig.

82. Zeitminute im Original nicht angegeben; nach der Folge der Zeiten kann sie 24 oder 25 sein 154 ist im Texte die richtige Minute angesetzt.

83. Die Minute 16′ ist im Original schon ausgestrichen, ohne dass jedoch die richtige angesetzt ist.

84. Das Original hat die Angabe des Microscops 033, 330,0 und zwar ist die erste 33, deren 2te Zahl überdem nicht ganz deutlich ist, ausgestrichen; ich lese sie jetzt nach der von Herrn Oeltzen am Wiener Meridiankreise bestimmten Declination 33 0.330, und glaube dass dies das Richtige sein wird.

85. Fad. 1 im Original 41′ 7″.6, woraus die verbesserte Durchgangszeit folgt; die 1 steht aber so nahe an der 4, dass sie übersehn, und die Zahl 47″.6 gelesen worden war.

86. Ein Fehler in der Durchgangszeit von 20″, der bei Nro. 158 entdeckt und verbessert ward, hat nach dem Zeugniss des Himmels schon bei diesen beiden Sternen statt gefunden.

87. Die Declination des Textes ist nach Z. 52 Nro. 16 und Bonner Meridianbeobachtungen über 0′.5 zu klein; ich kann diesen Fehler nur dadurch erklären, dass Henckel die Schraube zwar nach der richtigen Seite abgelesen hat, aber statt des richtigen Zehntheils 8 aus Versehn das darüber stehende auf die Ablesung nach der andern Seite sich beziehende genommen hat; ich halte die Correctur für richtig, zumal eine ganz ähnliche bei Z. 162 Nro. 51 nöthig ist. Vergleiche Bem. 90.

88. Unter Annahme dieser Correctur stimmt die AR. ganz vortrefflich mit zwei Bonner Meridianbeobachtungen, aber die Decl. ist 10″ bis 11″ zu klein, ohne dass das Original eine Erklärung für diesen Unterschied gäbe, und man muss also wohl annehmen, dass die Angabe des Microscops 2.678 ein Schreibfehler für 2.878 oder 2.978 oder vielleicht 2.876 ist.

89. Die Decl. von Nro. 143 war vor der von Nro. 142 eingestellt und abgelesen, demgemäss auch in die spätere Zeile aufgeschrieben, und die richtige Reihenfolge durch die vorgeschriebenen Zahlen 2, 1, bezeichnet. Diese Zahlen waren aber bei der Reduction übersehn worden.

90. Nur unter Annahme eines solchen Fehlers ist die Decl. mit Z. 159 Nro. 48 und einer Bonner Meridianbeobachtung in Uebereinstimmung zu bringen. Vergl. Bemerkung 87. Bei Oeltzen Nro. 1148 ist in der AR. ein Reductionsfehler: statt 15″.95 muss es heissen 15″.03.

91. Bei den 4ten Fäden der beiden vorhergehenden Sterne war eine Verzählung vorgefallen, wie ich während der Beobachtung vermuthete von —1″, und ich hatte daher auch die Durchgangszeit unseres Sterns, die ursprünglich 42′ 41″ eingetragen war, in 42′ 42″ verändert. Die andern Fäden von Nro. 139 und 140, so wie die Bonner Meridianbeobachtungen dieser Sterne zeigen aber, dass der Fehler nach der entgegengesetzten Seite begangen war, und es muss also auch die ursprüngliche Durchgangszeit unseres Sterns nicht um +1″, sondern um —1″ verändert werden. Nach dieser Verbesserung stimmt die AR. auch mit der von Johnson.

92. Im Original Nro. 8 an Fad. c ursprünglich 1′ 10″.5 +1″? und Nro. 9 an Fad. 1 2′ 39″.5 +1″. Nach Bonner Meridianbeobachtungen muss es aber beidemale —1″ heissen. Fad. e von Nro. 8 (siehe die Note des Textes) kann ich nicht erklären.

93. Fad. 3 im Original deutlich 45″, aber sicher verschrieben statt 40″.5. Nur so stimmt die AR. mit Z. 68 Nro. 26, einer Wiener und den Bonner Meridianbeobachtungen. Der Stern ist dupl. II. Cl. Str. Nro. 490.

94. Fad. e im Original 1′ ″.6 ohne Angabe der Secunde, was ich bei der Reduction für 1′ 0″.6 gelesen hatte. Die Secunde muss 16″ gewesen sein; denn der Stern ist der Begleiter von Nro. 4 = dupl. Str. Nro. 634.

95. Diese Correctur wird durch eine Bemerkung des Originals zur Gewissheit, welche lautet »3 Sterne gehn in nahe gleicher AR. 1.7 Fadenintervalle (= 59″) voraus«. Es sind dies die 3 Sterne Z. 89 Nro. 54, 55, 56, und unser Stern ist Z. 89 Nro. 57. An der uncorrigirten Stelle finden sich eben so wenig 3 vorausgehende, als unser Stern.

96. Eine falsche Ablesung kann diesen Fehler wohl kaum verursacht haben, wohl aber eine Verschreibung, veranlasst dadurch, dass Henckel mich von der Ueberschreitung der Gränze benachrichtigte, was denn auch wohl der Grund ist, dass ich den 1″ folgenden und 5′.6 südlichern Stern 9^m. Z. 87 Nro. 145 nicht beobachtet habe. An der uncorrigirten Stelle kommt weder in der Durchmusterung ein Stern vor, noch ist ein solcher bei mehrmaligem Suchen gesehn worden; corrigirt aber stimmt die Beobachtung mit Z. 87 Nro. 144 = Gr. 1009, der auch am Bonner Meridiankreise beobachtet ist.

97. Die fehlerhafte Reduction ist dadurch entstanden, dass ich die Fadenintervalle statt zu den beobachteten Zeiten dieses Sterns zu denen von Nro. 17 addirte.

98. Zeitminute ursprünglich wirklich 42′, nachher in 41 geändert, wahrscheinlich weil ich mir bewusst war, dass der Unterschied von dem vorhergehenden Sterne unter 1′ war; ich hätte aber bei diesem die Minute um 1′ vergrössern müssen.

99. Die Ablesung des Microscops war ursprünglich —3.800 eingetragen, und sind dann die Zehntel wahrscheinlich statt um 5, in 5 verändert worden, wie schon Oudemans (Astr. Nachr. Nro. 1014) vermuthet hat, und eine Bonner Meridianbeobachtung es bestätigt.

100. Die Zeitminute fehlt im Original; sie kann 52′ und 53′ sein; 53′ ist etwas wahrscheinlicher und das Rechte.
101. Die Durchgangszeit im Original nur ganz roh geschätzt, ist nach einer Bonner Meridianbeobachtung 13″ zu klein.
102. Die Zahl, mit der die Zeit am 4ten Faden eingetragen ist, sieht ganz wie 49′ 57″.5 aus; es ist aber über der 7 ein Punct gemacht, um sie als 1 zu bezeichnen, der bei der Reduction übersehn worden war; 51″.5 ist nach 2 Bonner Meridianbeobachtungen auch wirklich das Rechte.
103. Im Original ist bei der Zeit von Fad. d 12′ 16″ die Secunde als zweifelhaft angegeben, und desshalb noch Fad. f um 56″.6 beobachtet. Wahrscheinlich hatte ich bei Fad. d einen Fehler von 1″ bemerkt und diesen bei Fad. f nach der falschen Seite corrigirt, so dass also die richtigen Zeiten gewesen sind Fad. d 12′ 17″ Fad. f 58″.6. Unter dieser Annahme stimmt die AR. mit Z. 183 Nro. 66 und andern Bestimmungen.
104. Im Original Fad. 1 allerdings 6′ 46″.5, woraus die Durchgangszeit des Textes folgt, aber da um 47″ die Decl. eingestellt ist, wohl verschrieben statt 6′ 36″.5, was mit einer Bonner Meridianbeobachtung stimmt.
105. Die Zahl des Originals für Fad. 5. 59″ ist nicht ganz deutlich, und könnte auch 57 gelesen werden; daher die Bemerkung im Texte; aber 59″ ist viel wahrscheinlicher, und wird durch Z. 83 Nro. 74 und eine Bonner Meridianbeobachtung bestätigt.
106. Ein Fehler von —1″, der bei Nro. 83 entdeckt und verbessert ward, hat schon bei diesen 3 Sternen statt gefunden, für Nro. 80 und 81 nach Bonner Meridianbeobachtungen, für Nr. 82 nach Z. 186 Nro. 97, LL. 23438 und R. 4008.
107. Herr Oeltzen hat (Wiener Annalen 3te Folge Bd. 3. p. 121 ff.) schon bemerkt, dass in Zone 197 sich nach dem 98ten Sterne der 0-Punct der Declinationen verändert hat. Es ist dies wahrscheinlich dadurch entstanden, dass ich nach jenem Sterne, der sehr nahe der südlichen Gränze der Zone war, über diese hinaus gegangen bin, so dass der Kreisbogen an den Pfeiler gestossen ist und sich dadurch so verstellt hat, dass grössere Zahlen demselben Puncte des Himmels entsprochen haben, als früher, wodurch also eine grössere negative Correction des 0-Punctes nöthig wird. Ich habe nach dem Complexus aller sonst vorhandenen Bestimmungen diese Aenderung zu —40′ 40″ angenommen. Nach Nro. 129 ist aber, wie auch schon Herr Oeltzen gefunden hat, eine nochmalige, wenn auch viel kleinere Aenderung eingetreten, und ich habe daher die Nro. 130 bis 136 um —40′ 47″ corrigirt. Diesen Aenderungen gemäss sind die Durchgangszeiten u. s. w. neu berechnet worden.
108. Die Angabe der vollen Schraubenumgänge war im Originale anfänglich vergessen, und ist erst später, wohl nach der Erinnerung, dass sie dieselben wie bei dem nächsten gewesen, hinzugefügt; aber statt der des vorhergehenden, 5, sind fälschlich die des folgenden, 0, ergänzt.
109. In der uncorrigirten Position kommt weder in der Durchmusterung ein Stern vor, noch hat ein solcher am Himmel gefunden werden können, wogegen die Annahme dieses allerdings seltsamen Beobachtungs- oder Schreibfehlers die Position in vollkommene Uebereinstimmung mit 2 Bonner Meridianbeobachtungen bringt.

Verbesserungen und Zusätze in Spalte 8.

Zusätze zu dem Verzeichnisse Bd. I. p. 497 ff.

Pag.	Zone.	
4	2	statt: 59. 60 derselbe lies: 58. 60 derselbe.
4	2	statt: 77. im Original Fad. 5.d lies: 78. im Original Fad. 5.d.
5	3	Reductionstafel für 13ª 20′ k statt: —1′ 6″.17 lies: —1′ 6″.71.
7	4	Reductionstafel für 16ª 10′ k statt: —1′ 7″.17 lies: —1′ 7″.87.
15	11	25. 27 derselbe.
35	22	Die in der Einleitung p. XXVII für das k dieser Zone vorgeschlagene Correction +0″.60 ist zu stark; im Mittel aus 29 Sternen, die die Zone mit dem Radcliffe Catalogue gemeinschaftlich hat, folgt sie, nachdem der letztere durch Hinzufügung von —0″.06 auf meinen Aboer Catalog reducirt ist, mit sehr schöner Uebereinstimmung nur = +0″.26.
37	23	Note zu Nro. 54. Statt: wie bei 29 lies: wie bei 19.
43	25	71. Der Stern war 1862 Aug. 2, 14 und Sept. 20 bei sehr guter Luft nicht duplex.
60	32	7. Statt: Zeitsecunde zweifelhaft lies: Zeit zweifelhaft.
65	34	statt: 88. der Stern ist sehr roth lies: 37. der Stern ist sehr roth.

Pag.	Zone.	
72	38	63. 64 derselbe; der Stern war wenigstens 1861 Dec. 8 im Heliometer und 1862 Sept. 22 im Meridiankreise nicht als duplex zu erkennen, und es lässt sich auch keine der beiden Beobachtungen unter Annahme irgend eines plausibeln Fehlers mit einem andern Sterne identificiren.
80	41	k bei 23^{u} 40′ lies: +22″.20.
86	43	144. Statt der in der Note gemachten falschen Conjectur lies: die Fäden geben 47″.70 und 47″.00.
88	45	67. 71 derselbe.
94	47	Die Ordnungsnummer ist bei den 6 letzten Sternen um 1 zu vergrössern.
103	51	33. 34 derselbe.
107	52	98. Statt der Bemerkung des Textes lies: die Fäden geben 20″.92 und 20″.32.
124	59	57. 61 derselbe.
128	61	47. Vielleicht ist die Angabe des Microscops 4.130 verschrieben statt 4.310; dann würde die Decl. 46° 12′ 17″.9 und stimmt gut mit Lalande und einer Bonner Meridianbeobachtung, während sie ohne die Aenderung 7″ zu klein ist.
133	64	60. Die Zeit ist nur in ganzen Secunden und als zweifelhaft angegeben; sie scheint ganz roh geschätzt zu sein und ist 9″ zu klein.
143	70	82. 84 derselbe.
149	73	32. 34 derselbe.
158	77	123. 125 derselbe.
164	79	87. 95 derselbe.
173	83	111. 113 derselbe.
188	89	56. Die Grösse ist richtig 9^{m}. und die Bemerkung verfällt daher.
189	89	90. 93 derselbe.
	89	Reductionstafel für D = 71° 0′ und T = 6^{u} 30′ lies: k —16″.60.
194	91	Reductionstafel. Ueberschrift statt: D = 69° 30′ lies: D = 69° 0′.
197	92	74. Grösse im Original ursprünglich 8^{m}. nachher in 9.0 verwandelt. Wahrscheinlich war vergessen, die Grösse zu notiren, es wurde daher die Grösse von Nro. 75 in die leere Reihe gesetzt, und dann, als das Versehn bemerkt wurde, diese aus der Erinnerung in die richtige verwandelt.
203	94	erste Bemerkung gehört zu Nro. 121 nicht Nro. 125.
212	99	5. Statt: Zeit +1″? lies: Zeit +1′ ?.
217	101	Reductionstafel. Die Zeichen der Differenzen von k sind —, nicht +.
228	105	Reductionstafel. Ueberschrift lies: D = 52° 30′.
233	108	Corr. d. Instr. bei 61° 30′ lies: —2″.439. Druckfehler.
235	109	53. Bei diesem Sterne ward ein Fehler von —1″ in der Zeit entdeckt und verbessert; ob dieser Fehler schon früher statt gefunden, lässt sich nicht entscheiden, da neuere Bestimmungen für einige der Sterne 47—52 ihn wahrscheinlich machen, für andre nicht. Die Beobachtungen scheinen schlecht zu sein.
243	112	148. 150 Bemerkung verfällt: das Mittel mit Rücksicht auf die Anzahl der Fäden stimmt fast vollkommen mit einer Bonner Meridianbeobachtung.
248	114	Ordnungsnummer 135; statt dessen lies: 133. Druckfehler.
	115	26. 27 beide Sterne Grösse statt: 8.9 lies: 9.0. Abschreibefehler.
249	115	101. 103 derselbe.
271	123	124. 128 derselbe.
286	129	77. Statt der angesetzten Note lies: Fad. 4, der 2.″74 giebt, nach einer Bonner Meridianbeobachtung ausgeschlossen.
289	130	81—91. Die Minute ist richtig, und die Bemerkung verfällt daher.
293	132	52. 59 derselbe.
299	134	97—100. Die Durchgangszeiten sind richtig, und die Bemerkung verfällt.
318	139	19. Grösse 9.0. Druckfehler.
320	139	119. 120 derselbe.
321	140	Reductionstafel: die Minute der k statt: —3′ lies: —1′.
322	140	88. Der Stern ist wirklich duplex. Krueger hat 1862 Jan. 6 im Heliometer geschätzt: Dist. = 2″ Pos. wink. 45° Comes schwach 9.0^{m}.

Pag.	Zone.	
327	142	3. Grösse statt 1^m. lies: 9^m. Druckfehler.
350	149	83. 84 derselbe. Der Stern ist nicht duplex. Er ist übrigens 7^m., also hat die Trübung, dessentwegen die Zone geschlossen wurde, schon hier statt gefunden.
365	154	130. 134 derselbe.
368	155	88. Bemerkung (Zusätze pag. 499) verfällt, der Faden ist hier richtig.
369	155	96. 99 derselbe.
375	157	111. 115 derselbe.
384	160	127. Der Stern ist wirklich duplex I. Cl. schwach 8.9^m. und 9^m. Distanz = 2″ Pos. wink. = 320° ungefähr.
423	176	28. Grösse 8^m. Druckfehler.
429	178	In dieser Zone scheinen viele Verzählungen von Secunden vorgefallen zu sein. Es mag wohl ein heftiger Wind geweht haben.
434	180	statt: 21. 37 derselbe lies: 31. 37 derselbe.
435	180	Für die letzten Sterne dieser Zone von Nro. 95 an würde man wohl bessere Rectascensionen erhalten, wenn man den k die Correction —0″.56 hinzufügte.
437	181	68. 71 derselbe.
439	182	62. Grösse 8^m., 63. Grösse 9^m. Druckfehler.
448	185	statt: 121 Zeit zweifelhaft lies: 131 Zeit zweifelhaft. Druckfehler.
471	195	Reductionstafel. Ueberschrift D statt: 73° 30′ lies: 73° 0′.
478	198	Die k der Reductionstafel sind auf dieser und den 3 folgenden Seiten so zu corrigiren:

u	′	″		u	′	″		u	′	″	
11	50	—26.26	+5	12	40	—25.97	+6	13	30	—25.64	+7
12	0	—26.21	+6		50	—25.91	+7		40	—25.57	+7
	10	—26.15	+6	13	0	—25.84	+6		50	—25.50	+7
	20	—26.09	+6		10	—25.78	+7	14	0	—25.43	+7
	30	—26.03	+6		20	—25.71	+7		10	—25.36.	

482	200	3. Ordnungsnummer lies: 2 und Grösse 9^m., 3. Grösse 8^m. Druckfehler.

Nachträge zu dem Fehler-Verzeichniss für die Bessel'schen Zonenbeobachtungen.

Band IV. pp. I. f.

Zone	Durchgangszeit	Grösse	Fad.	Durchgangszeit	Microscop Scale	Microscop Schraube	Declination	Bemerkungen	Anmerkungen
	u ′ ″			u ′ ″			° ′ ″		
2.	19 24 41.70	—	—	19 24 40.70	—	—	—		Bemerkung recht.
8.	20 52 17.79	—	—	20 52 16.79	—	—	—		Bemerkung recht.
13.	21 1 7.18	—	—	21 1 6.18	—	—	—		168.
24.	21 23 12.20	—	—	—	42	1092	+13 36 8.5		169.
29.	0 47 18.51	—	—	—	40	1073	+10 30 35.3		
40.	1 23 50.62	—	—	1 23 50.62	—	—	—		Bemerkung verfällt.
52.	7 29 16.84	—	3	7 29 46.40	—	—	—		
95.	17 16 7.93	—	—	—	—	—	—		170.
116.	0 15 24.64	—	—	0 15 23.64	—	—	—		Bemerkung recht.
126.	2 34 16.71	—	—	2 34 17.71	—	—	—		Bemerkung recht. 171.
137.	3 31 46.14	—	—	—	49	970	+12 3 12.2		172.
176.	17 35 54.10	—	—	—	—	—	—		173.
310.	20 52 57.30	—	—	—	25	1585	+33 14 11.2		Bemerkung recht. 174.
338.	6 0 40.32	—	—	6 0 41.32	—	—	—		Bemerkung recht.
380.	22 42 7.81	—	—	22 42 8.81	—	—	—		Bemerkung recht. 175.
401.	7 57 22.30	—	—	—	—	—	—		176.
403.	8 11 52.81	—	—	8 11 42.81	—	—	—		177.
431.	19 12 37.30	—	—	—	38	1193	+18 35 14.4		178.
435.	20 0 8.88	—	—	20 1 8.88	—	—	—		179.
443.	0 35 25.80	—	—	0 35 27.80	—	—	—		180.
462.	13 8 59.00	—	—	—	—	—	+27 12 13.7		Fehler des Drucks.
475.	15 43 10.51	—	—	15 43 9.51	—	—	—		Bemerkung recht. 181.
509.	6 10 59.20	—	—	—	39	997	+40 34 52.2		
534.	1 29 16.46	—	—	—	—	—	—		182.

Bemerkungen zu dem vorstehenden Verzeichniss.

168. Nach dem übereinstimmenden Zeugniss von 3 andern Zonen und einer Bonner Meridianbeobachtung. Vielleicht Reductionsfehler.

169. Bei der Berechnung der Declinationen dieser Zone ist der 0-Punct fälschlich +11° 23′ 55″.9 oder +11° 23′ 56″.0 statt +11° 23′ 55″.0 angenommen.

170. Die Durchgangszeit ist nach Bond und einer Bonner Meridianbeobachtung 1862 Juni 13 über 2″ zu gross; der Stern ist an Fad. 4 um 16′ 22″.2 beobachtet; vielleicht ist dies ein Schreibfehler statt 20″.2.

171. Hiernach ist die Angabe des frühern Fehlerverzeichnisses zu corrigiren, die auf die Autorität von Weisse (Note zu II^{u}. 619) gemacht war. Zwei Bonner Meridianbeobachtungen zeigen, dass Weisse's Angabe 1″ zu gross ist, Bessels nur 1″ zu klein.

172. Bei Weisse III^{u}. 626 ist ein Druckfehler in der Declination, die Minute muss 1′ statt 2′ sein, corrigirt aber +12° 2′ 27″.5. Der Stern scheint eine kleine EB. in Decl. von —0″.14 jährlich zu haben.

173. Weisse (XVII^{u}. 736) hat diese AR. ausgeschlossen, wahrscheinlich auf Bessels Rath; sie ist wirklich über 1″ zu gross; vielleicht findet sich im Original ein Zweifel.

174. Aber auch nach der Correction ist die Declination 6″ bis 7″ zu gross; vielleicht könnte die Zahl, die wohl undeutlich ist, anders gelesen werden.

175. Hiernach ist die Angabe des frühern Fehlerverzeichnisses zu corrigiren. Der Fehler ist dadurch entstanden, dass die zur Verificirung angestellte Beobachtung am Bonner Meridiankreise an einem Tage gemacht wurde, an welchem, wie später gefunden, der eine Zapfen häufig sich aus seinem Lager gehoben hatte, wodurch die AR. falsch geworden war.

176. Der Stern ist nicht duplex, sondern die Bemerkung gehört zu dem folgenden Sterne. Vergl. die Anmerkung 107 zum frühern Verzeichniss.

177. Hiernach ist die frühere Angabe zu corrigiren. Vergl. dort die Note 110.

178. Die in der Note 117 vorgeschlagene Aenderung der Schraubentheile war gewiss wenig wahrscheinlich, wesshalb ich auch nicht gewagt hatte, sie in den Text aufzunehmen; die jetzige, die das Complement der Angabe des Textes zu 1000 ist, ist, wenn auch ungewöhnlich, so doch leicht zu erklären: es ist von 1000 an nach der verkehrten Seite abgelesen worden. Durch diese Aenderung kommen nach Verbesserung eines Reductionsfehlers in der Bonner Beobachtung 1858 Aug. 5, alle Beobachtungen in sehr gute Uebereinstimmung. Man erhält nämlich nun für 1825 die Position aus

Lalande	19ᵘ 13′	13″.43	+18° 33′ 56″.9
Bessel		13.64	51.6
1858 Aug. 5		13.49	53.5
1861 Aug. 6		13.57	54.3

also da die Reduction auf meinen Catalog für die Decl. von Lalande −2″.5 von Bessel +1″.3 ist, fast vollkommene Uebereinstimmung, und ich halte daher die jetzige Correctur für so sicher, wie überhaupt solche Correcturen sein können, die nicht zu den ganz gewöhnlichen gehören.

179. An der Correction der Zeitminute ist kein Zweifel, da schon die Folge der Zeiten sie fordert, aber die Declination ist gegen zwei Bonner Meridianbeobachtungen 1858 Juli 20 und 1862 Aug. 1 um 5″ bis 6″ zu klein; sollte vielleicht die Ablesung der Schraube 1480 ein Fehler statt 1460 sein? dann würde die Declination 31° 3′ 39″.6.

180. Die Correctur wird durch Lalande und zwei Bonner Meridianbeobachtungen gefordert; vielleicht Druckfehler oder Verbesserung eines Fehlers von 1″ nach der falschen Seite.

181. Hiernach ist die frühere Angabe zu corrigiren. Bei der Bonner Meridianbeobachtung war ein Reductionsfehler von 1″ begangen, der durch eine 2te entdeckt wurde.

182. Die frühere Correction war nach der Durchmusterung gemacht; zwei Meridianbeobachtungen haben aber gezeigt, dass Bessel's Declination nicht 3′ sondern nur 2′ 33″ bis 34″ zu gross ist. Der Unterschied verringert sich um 9″, wenn man das Microscop 56.880 liest, was viel plausibler ist, weil die Scalentheile beim folgenden Sterne nur 736 sind; aber es bliebe immer noch ein Unterschied von 17″ bis 18″ durch EB. zu erklären, die mir nicht sehr wahrscheinlich erscheint. Ich vermuthe vielmehr, dass die Angabe der Scalentheile durch irgend einen Fehler entstellt ist; 56.930 würde Uebereinstimmung mit meinen Beobachtungen herbeiführen.

Berichtigungen zum Bonner Sternverzeichnisse.

Band III.

Seite	Zone	Nro.	
1	— 1°	179	hinzuzufügen L.
		180	zu streichen L.
11	— 1	3047	statt K lese man L.
		3080	nach dieser Nummer ist einzuschieben $9^m.5$ 33′ 23″.7 19′.1.
12	— 1	3201	statt K lese man B.
		3294	AR. statt 59′ 59″.8 lese man 58′ 59″.8.
15	— 1	4187	ist zu streichen; der Stern ist identisch mit dem vorhergehenden.
		4261	hinzuzufügen S.
		4279	hinzuzufügen S.
		4285	hinzuzufügen R.
16	— 1	4473	hinzuzufügen S.
17	— 0	259	AR. statt 32′ 48″.7 lese man 32′ 58″.7.
44	+ 0	3559	AR. statt 31′ 39″.7 lese man 31′ 29″.7.
47	+ 0	4553	Decl. statt 43′.1 lese man 44′.1.
		4598	statt K lese man B.
55	+ 1	1635	AR. statt 52′ 52″.0 lese man 52′ 57″.0.
		1878	ist zu streichen; der Stern ist identisch mit +2° Nro. 1742.
71	+ 2	1415	AR. statt 42′ 8″.1 lese man 42′ 18″.1.
87	+ 3	1606	zu streichen B.
		1607	hinzuzufügen B.
		1695	AR. statt 21′ 56″.0 lese man 21′ 56″.9.
88	+ 3	1892	AR. statt 58′ 52″.9 lese man 58′ 42″.9.
93	+ 3	3331	Decl. statt 58′.4 lese man 59′.4.
97	+ 3	4465	zu streichen L.
		4466	hinzuzufügen L.
99	+ 4	30	AR. statt 11′ 31″.4 lese man 11′ 34″.4.
107	+ 4	2387	AR. statt 42′ 54″.9 lese man 42′ 54″.4.
113	+ 4	4262	hinzuzufügen K.
		4263	zu streichen K.
114	+ 4	4604	AR. statt 56′ 36″.0 lese man 56′ 56″.0.
118	+ 5	595	AR. statt 0′ 48″.4 lese man 0′ 58″.4.
128	+ 5	3529	AR. statt 46′ 9″.1 lese man 46′ 6″.5.
146	+ 6	3649	statt $8^m.5$ 5′ 3″.3 49′.5 lese man neb. 5′ 4″.0 49′.4 B.
150	+ 6	4724	Decl. statt 20′.0 lese man 23′.0.
162	+ 7	3173	Decl. statt 38′.8 lese man 36′.8.
170	+ 8	225	zu streichen B.
		226	hinzuzufügen B.
183	+ 8	4139	statt dieses Sterns lese man folgende zwei $9^m.2$ 26′ 12″.2 40′.6 B und $9^m.2$ 26′ 17″.2 40′.6 B.
184	+ 8	4385	nach diesem Stern ist hinzuzufügen var. 7′ 55″.1 38′.8.

Seite	Zone	Nro.	
186	+ 8°	5154	ist zu streichen.
188	+ 9	492	nach diesem hinzuzufügen $9^m.2$ 40′ 24″.2 40′.1 B.
193	+ 9	1872	hinzuzufügen K.
193	+ 9		Col. IV Spalte II. Ueberschrift statt 10^u lese man 8^u.
201	+ 9	4353	AR. statt 52′ 19″.0 lese man 52′ 19″.9.
202	+ 9	4671	statt L lese man B.
123			Ueberschrift statt 10^u—13^u lese man 11^u—13^u.
213	+10		Col. I Spalte II. Ueberschrift statt 10^u lese man 11^u.
221	+10	4830	ist zu streichen.
238	+11	4870	statt $9^m.3$ 38′ 46″.9 21′.1 B lese man $9^m.5$ 38′ 43″.7 17′.8 B.
252	+12	3890	nach diesem hinzuzufügen $8^m.3$ 14′ 46″.5 59′.4 K.
272	+13	4420	statt 24′ 15″.7 17′.9 B lese man 24′ 19″.1 16′.9 B.
309	+16	15	statt K lese man B.
		16	hinzuzufügen K.
323	+16	4351	Grösse statt 9.5 lese man var.
326	+17	199	Grösse statt 9.0 lese man 9.5.
371	+19	2965	statt K lese man B.
		2966	hinzuzufügen K.

Band IV.

64	+23	3197	nach diesem hinzuzufügen $9^m.4$ 45′ 35″.7 8′.3.
74	+24	1130	K zu streichen.
142	+28	1633	nach diesem hinzuzufügen $9^m.5$ 30′ 52″.7 25′.2 B.
148	+28	3393	nach diesem hinzuzufügen $9^m.3$ 28′ 24″.0 7′.2 B.
154	+29	281	statt L lese man K.
186	+30	4650	nach diesem hinzuzufügen $9^m.3$ 6′ 54″.5 40′.2 B.
212	+32	1975	ist zu streichen. Es stehn hier 2 Sterne 10^m. in 3′ Abstand.
237	+33	4609	Decl. statt 55′.1 lese man 27′.7.
254	+34	4438	nach diesem hinzuzufügen $9^m.5$ 24′ 35″.7 7′.9.
256	+34	5061	hinzuzufügen K.
259	+35	701	nach diesem hinzuzufügen var. 20′ 50″.5 10′.0 K.

Band V.

36	+43	447	nach diesem hinzuzufügen $9^m.2$ 12′ 38″.0 7′.9 B.
53	+44	612	nach diesem hinzuzufügen $9^m.3$ 51′ 30″.7 19′.1 B.
192	+53	3099	ist zu streichen.
214	+55	2886	AR. statt 58′ 17″.5 lese man 58′ 12″.5.
260	+60	1339	AR. statt 32′ 49″.5 lese man 32′ 49″.9.
262	+60	1999	B zu streichen.
		2000	B hinzuzufügen.
263	+60	2143	Decl. statt 36″.0 lese man 35″.6.
264	+60	2313	AR. statt 50′ 1″.8 lese man 50′ 2″.7.
315	+67	1498	23^u zu streichen.
		1499	23^u hinzuzufügen.
379	+86	318	n zu streichen.

Kleinere Fehler in den Zehnteln der Zeitsecunde oder Bogenminute sind nicht angegeben, eben so wenig die vielen Sterne, die nach Vollendung des Druckes hier bestimmt worden sind, und denen also ein B hinzuzufügen wäre. **Da die Reduction dieser Beobachtungen schon bedeutend voran geschritten ist, so wird hoffentlich der Catalog selbst nicht lange mehr auf sich warten lasssen.**

Zone +41°

1—40				41—80				81—120				121—160				161—200			
	ou	+41°			ou	+41°			ou	+41°			ou	+41°			ou	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.7	0 19.1	53.8	K	9.4	14 11.1	57.9	B	9.5	25 17.8	59.0		9.0	36 15.9	14.0		9.5	46 23.9	57.1	
8.6	45.4	26.6		9.0	18.1	25.2	K	8.9	55.4	37.0		9.5	45.1	21.5		9.0	55.7	40.0	
8.4	56.1	7.4	K	9.3	18.2	43.1		9.5	26 6.4	41.1		8.0	51.9	42.1	K	7.8	47 7.7	27.9	K
9.4	1 40.9	27.3	K	9.0	22.9	15.7	K	9.0	10.5	17.3	K	9.0	37 4.0	35.3		8.0	9.9	53.7	K
9.1	54.0	43.9		9.5	38.6	57.9		9.5	22.8	5.0		9.3	38 14.4	54.5		9.2	50.0	23.5	
9.3	2 5.9	18.7		9.0	44.1	47.9	K	9.0	45.4	21.5		9.2	44.0	31.0	B	9.2	54.8	22.1	
9.5	12.4	54.4		9.0	15 26.0	34.7		7.7	27 14.6	54.5	K	8.8	55.3	55.7		9.5	48 3.6	52.6	
9.2	31.9	55.9	B	9.5	27.2	46.7		9.5	15.4	25.9		9.5	55.8	30.6		9.4	14.0	17.3	
8.5	50.6	47.2	K	9.5	29.7	41.5		9.5	39.4	24.6		9.3	39 0.3	7.3		9.5	43.0	52.0	
9.5	55.4	16.0		7.9	59.4	16.3	K	9.4	28 0.9	18.0		8.6	6.4	9.7	K	9.3	49 13.7	14.4	
9.4	4 8.3	0.3		9.5	16 2.2	17.4		8.8	4.5	35.6	K	9.0	23.9	19.8		9.5	29.0	28.9	
9.2	16.8	0.3		9.5	27.1	15.2		9.5	29 5.2	27.3		9.4	25.6	2.7		7.5	40.0	41.7	K
9.5	20.7	46.0		9.4	28.9	33.4		9.5	26.9	32.9		8.5	30.4	26.6		9.3	41.8	11.8	
9.4	33.6	35.0		9.5	51.0	56.9		9.1	32.3	8.8		9.5	43.0	58.0		9.0	50 10.3	13.5	K
9.5	56.1	46.0		9.3	57.4	44.4		9.5	50.7	5.8		9.5	58.1	59.4		9.0	14.7	27.5	
9.4	5 5.5	6.8		9.3	17 6.1	18.3	K	8.0	52.6	44.8	L	9.5	40 18.4	19.8		9.5	27.5	32.3	
9.5	18.1	54.9		9.2	30.9	47.6		8.8	57.3	54.4	L	9.5	24.3	46.2		9.0	31.3	4.7	
8.8	23.2	3.0	K	9.5	41.2	32.5		9.5	30 7.0	52.7		8.8	25.7	9.3	K	9.5	48.2	20.5	
9.1	54.4	38.6	K	9.5	58.1	32.5		9.5	58.9	8.8		9.5	34.4	23.2		9.5	48.8	8.3	
9.5	6 9.6	55.3		9.1	18 4.4	50.6	K	8.3	31 27.4	8.1	K	8.8	54.1	54.1		9.5	50.4	53.5	
9.5	16.3	17.7		9.4	29.6	10.0		9.0	55.0	35.2	K	9.5	41 11.9	25.5		9.5	51.7	1.4	
8.3	28.2	10.5	K	9.1	39.0	59.9	K	9.2	32 17.3	49.8		9.1	42.9	37.7	B	9.5	51 25.9	44.8	
9.3	7 11.9	59.6		9.5	19 7.2	54.2		9.2	38.3	2.6		9.5	45.9	39.9		9.3	52 28.2	23.3	
9.3	50.1	34.9		9.4	42.2	21.2		9.5	45.0	33.8		9.5	42 22.5	45.1		9.4	51.7	44.8	
9.5	8 1.4	20.5		9.5	51.5	27.6		8.7	47.1	6.9	K	9.5	23.8	51.8		8.9	52.9	2.1	K
9.5	15.4	50.4		9.5	55.9	22.3		9.4	33 8.7	0.1		9.2	35.9	22.0	B	9.3	53 2.5	34.2	
8.8	16.1	31.5	K	8.4	20 30.4	23.2	K	9.4	23.0	18.3		9.5	38.0	38.1		8.9	17.2	56.7	K
8.5	9 8.1	2.8	K	9.0	21 1.2	48.0		9.4	25.6	15.3		8.5	53.6	8.3	K	9.2	53.4	51.7	
8.8	49.9	28.7		8.4	1.6	35.2	K	8.8	27.6	24.3		9.3	44 1.4	26.2		9.5	54 9.2	51.9	
9.5	51.5	2.2		9.4	22 11.7	9.0		9.1	45.4	29.0		9.0	21.2	32.3	K	8.5	9.5	57.1	K
9.5	51.5	19.1		9.4	23.4	38.3		9.5	34 7.9	49.0		9.5	24.5	54.9		9.3	15.7	24.7	
9.5	53.4	16.0		9.4	28.4	32.5		9.5	17.1	10.4		9.3	27.8	48.0		9.3	17.2	44.	
9.5	10 5.9	58.6		9.4	50.9	47.3		9.5	39.6	26.7		9.4	33.7	30.4		9.5	31.8		
9.3	19.5	17.3	B	7.5	23 39.0	44.1		9.0	41.1	9.3	K	9.1	45 2.2	48.0		8.8	55 35.8		
8.3	56.1	10.4	K	9.5	39.0	3.5		9.2	41.2	11.2		9.3	30.3	6.8		9.3	59		
9.5	11 7.4	40.8		9.4	24 9.8	2.6		9.2	50.4	47.6		9.5	46.2	53.2		9.4	56		
9.1	46.8	12.9	K	9.1	14.7	26.0		9.4	35 20.0	52.1		9.5	46 1.8	17.5		9.3			
9.4	12 36.4	29.1		9.1	17.4	46.3		9.4	46.7	5.6		9.3	4.8	19.2	B	9.2			
9.5	44.4	27.7		9.5	37.0	52.6		8.8	52.4	29.3		9.5	5.8	17.4		9.4			
9.1	13 48.5	16.3		9.1	25 8.9	27.4		8.8	36 4.7	55.1		9.3	18.7	1.0		9.5			

201—260				261—320				321—380				381—440				441—500			
	0h—1h	+41°			1h	+41°			1h	+41°			1h—2h	+41°			2h	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	56 47.7	58.7		9.0	14 21.2	12.7	K	8.8	31 1.2	59.7	K	8.8	49 1.8	15.7	R	9.5	11 5.0	44.6	
9.5	57 1.8	17.8		9.4	36.3	49.8		9.5	11.4	12.5		9.1	2.7	42.0		9.5	6.6	53.0	
8.3	12.5	52.6	L	9.5	15 5.3	51.0		9.5	41.3	46.4		8.5	13.4	23.4	K	9.5	21.4	12.1	
9.5	58 7.0	39.6		9.5	22.2	30.0		9.5	50.9	29.0		9.2	22.3	35.7		9.5	22.0	3.6	
9.2	8.7	47.5	K	9.5	24.5	59.1		9.2	32 30.0	9.7	B	9.1	50 28.3	4.8	B	9.5	42.6	29.4	
9.5	45.3	10.3		9.5	55.0	19.0		9.4	30.7	36.5		9.5	50.0	55.2		9.5	52.2	58.5	
9.5	47.4	29.4		9.3	16 16.2	29.5		9.2	53.7	33.0	B	8.9	51 41.7	36.9	K	9.1	56.1	20.5	B
9.5	59 4.4	4.8		8.8	40.4	42.9		5.3	59.4	53.1	K	9.3	52 40.3	49.2		9.3	13 9.6	56.6	
9.2	19.6	31.6		9.0	50.4	32.5		8.5	33 39.2	10.3	K	9.0	43.9	43.7	K	9.3	11.5	12.5	
8.8	29.2	59.7		8.7	17 5.1	9.9		8.5	47.5	27.4	K	9.4	53 5.9	18.1		9.2	14 0.7	33.2	
8.5	37.5	51.8	K	9.5	32.8	54.5		8.7	34 5.9	58.2	B	9.4	17.5	57.5		9.0	28.0	4.6	
9.1	50.7	23.4		9.3	41.0	2.3		9.5	15.9	56.0		8.5	37.9	20.3		8.9	55.8	45.2	B
9.3	0 8.6	51.0	B	7.3	48.4	32.9	L	9.3	26.3	22.8		9.5	54 26.3	49.1		6.9	57.7	26.4	K
9.0	16.5	29.9	B	9.3	18 38.5	6.9	B	9.3	29.1	54.0		9.5	34.6	4.4		9.4	15 26.2	5.0	
8.9	48.8	33.2		9.3	54.2	18.0		9.0	30.2	2.5		2.0	55 1.7	37.6	K	9.3	51.4	8.4	
9.2	1 8.7	54.7		8.7	19 15.9	51.1		9.4	55.3	58.2		9.5	15.3	3.5		9.2	51.6	20.0	
9.0	10.2	51.3	K	9.5	35.6	36.9		9.4	35 26.4	15.5		9.0	22.0	51.7		9.4	16 7.3	21.0	
8.5	21.2	47.2	K	7.9	38.7	42.9	B	9.3	36 0.3	10.3		8.9	27.2	22.2		9.0	35.1	20.5	K
6.2	2 8.3	18.2	L	9.4	53.5	45.7		9.4	10.9	38.9		9.2	31.1	52.3		9.5	36.3	12.6	
9.4	10.5	12.0	B	9.4	56.8	40.6		9.3	30.4	46.3		9.2	56 19.8	38.4		9.4	43.5	2.8	
8.0	25.7	22.3	L	9.0	20 0.3	39.6	B	9.5	37 57.8	50.0		9.5	57 12.6	50.6		9.5	17 4.6	42.4	
9.1	29.1	35.1		9.5	4.5	42.3		8.7	38 31.7	28.1	K	9.0	38.5	4.2	K	9.4	18 2.5	31.8	
8.7	3 35.6	18.5	K	7.0	7.2	30.4	L	9.5	47.4	22.4		9.5	51.9	3.2		9.5	30.7	27.4	
8.1	40.7	27.8	L	9.2	19.4	59.7		9.1	55.3	34.2	B	9.5	58.0	9.3		8.5	33.0	21.0	
9.5	57.8	37.0		8.5	20.3	36.4		9.1	39 1.2	3.2	K	9.3	58 50.2	54.6		9.5	36.5	35.8	
9.5	4 20.3	47.3		8.4	24.0	56.5		9.1	1.8	50.7		8.5	59 33.0	25.4		8.7	19 27.0	4.9	K
9.5	5 14.9	40.0		9.0	54.0	46.9		9.0	4.3	41.7	K	8.4	33.0	49.6		8.5	36.1	16.6	K
9.3	6 38.4	3.8		7.5	54.9	31.5	K	9.4	8.8	54.0		8.0	44.2	29.0		9.2	20 45.8	47.6	K
8.2	49.9	3.3	K	9.3	58.4	43.0		9.5	19.2	1.6		9.3	53.7	1.7		9.5	21 4.6	15.5	
9.5	7 4.0	30.4	B	7.8	21 23.5	52.9		9.2	40 7.5	2.9		9.5	0 3.0	30.2		8.6	17.5	27.9	
9.0	5.3	24.8	K	8.8	28.0	38.8		8.8	9.0	31.8		7.5	9.7	16.5	K	9.3	46.0	8.8	
8.5	16.8	58.1	K	8.5	28.8	15.5	K	8.9	13.8	59.0	B	8.0	44.2	18.7		9.5	22 3.1	54.1	
9.5	25.2	41.7		8.5	46.8	6.3	K	8.4	32.3	16.5		9.0	49.9	59.7		9.3	6.5	51.0	
9.1	8 17.6	29.3		9.5	22 48.5	44.1	B	9.2	40.0	48.5		9.5	1 24.0	40.3		7.7	15.5	54.9	L
9.5	27.3	44.9		9.5	51.5	2.6		9.5	42.8	23.6		9.5	29.0	33.4		8.3	27.2	12.7	K
8.4	47.2	7.6	K	9.3	23 2.8	35.4	K	9.5	41 13.9	2.7		9.5	30.0	36.6		8.0	50.5	44.2	K
9.5	48.2	54.0		9.5	54.0	24.1		9.0	23.3	43.3		9.3	41.1	11.6	K	9.4	23 33.7	4.7	
8.5	53.7	17.1	L	9.5	24 24.3	48.9		8.8	40.2	23.7	K	8.3	2 28.8	57.7		9.5	40.6	27.4	
9.3	9 26.5	7.4	K	9.5	34.8	51.0		9.5	42 1.8	26.8		8.8	29.4	37.7		9.3	47.8	19.9	B
8.8	36.3	25.3	K	8.5	52.9	35.4		9.5	10.3	44.9		9.0	54.8	35.7	K	7.5	24 2.0	11.3	K
9.1	58.2	45.8		9.3	58.0	50.8		9.5	43 52.9	37.5		8.9	3 2.5	5.4		9.5	36.0	10.6	
9.5	10 18.3	33.1		9.3	25 15.8	34.1		8.0	44 3.0	7.7	K	8.0	12.0	27.3	K	9.3	25 18.1	42.8	
9.1	24.6	55.5	K	8.7	40.9	50.3		9.0	8.8	2.5		9.5	16.2	58.0		9.5	25.6	2.3	
9.3	46.7	10.6	K	7.8	47.7	38.0	K	8.8	26.9	48.8		9.2	4 27.2	37.8	K	9.5	33.1	54.0	
9.5	49.0	12.6		9.0	52.2	33.9		9.2	44.2	28.5	K	9.5	55.2	34.8		8.5	40.0	8.9	
8.4	11 22.1	49.0	B	9.1	57.9	38.2	B	9.5	45 17.9	56.8		8.7	5 49.7	13.9	K	9.1	40.1	37.8	
9.2	24.9	40.7		9.3	26 10.1	29.0	B	9.3	23.8	0.0	K	9.5	6 29.2	16.0		8.8	40.2	29.0	
9.0	25.0	1.1	K	9.3	17.5	32.8		9.5	24.2	25.1		9.5	30.9	10.1		8.9	26 15.1	29.0	
9.5	29.8	57.8		8.9	21.7	32.0	K	9.5	46 11.3	44.9		9.5	41.3	34.7		9.5	35.5	48.7	
9.5	37.7	27.2		9.5	27.8	38.8		9.1	58.8	15.6	B	8.0	45.7	46.5	L	9.4	58.1	36.0	
9.5	39.9	1.5		8.3	43.3	38.8	K	9.5	47 2.0	42.7		9.5	7 9.8	16.4		9.3	27 2.6	16.5	K
7.0	46.2	12.6	K	9.5	27 36.3	31.8		9.5	32.8	34.2		9.5	50.2	15.4		9.4	9.6	33.9	
9.5	51.7	30.4		9.5	59.8	19.2		9.1	36.6	59.8		8.4	8 23.1	42.6	K	9.3	10.0	38.2	B
9.5	12 5.4	24.6		8.3	28 8.5	11.9	K	7.0	46.2	10.6	K	9.0	39.4	42.0	K	9.5	10.1	14.0	
9.5	28.0	27.9		8.7	18.5	55.0		9.4	57.6	35.7	B	7.9	42.4	55.1	K	7.3	25.0	45.8	K
8.8	13 33.5	57.1	K	9.3	29 1.3	58.0		9.5	48 3.2	23.1		9.1	9 16.0	14.9		7.3	51.5	25.9	K
9.1	48.0	21.6		8.9	18.9	26.7	B	8.0	28.2	4.0	K	9.5	23.3	41.2		9.5	28 3.1	26.5	
9.0	14 1.8	34.6		9.4	49.5	55.0		8.8	31.6	59.7		9.5	59.5	50.0		9.4	37.0	32.5	B
9.0	18.3	20.8	K	9.5	30 6.8	56.7		9.0	41.8	22.9		9.1	10 17.8	47.5	B	9.5	29 2.6	0.8	
9.0	20.5	47.1	B	9.3	30.4	31.9		9.3	57.5	1.5	K	9.1	24.8	25.3		9.1	10.1	29.9	

501—560.				561—620				621—680				681—740				741—800			
	2ᵘ		+41°		2ᵘ		+41°		3ᵘ		+41°		3ᵘ		+41°		3ᵘ		+41°	
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	
9.0	29	11.7	35.4	8.5	45	17.5	33.0	B	8.2	0	18.1	42.1	B	8.4	16	49.4	46.7	K	9.5	35	2.7	12.2		
9.4	30	29.0	43.1	9.3		41.9	1.2		8.6		31.3	17.5	K	9.4	17	27.7	20.1		7.5		43.6	33.9	K	
9.4		36.1	23.4	9.5	46	5.6	59.5		8.5		32.7	11.3	K	9.4		36.9	16.2		9.5		53.7	2.3		
9.5		49.7	34.3	9.4		14.4	32.7		8.5	1	17.9	2.7	K	9.2	18	0.4	1.2		8.6	36	16.2	20.7	B	
9.5		56.2	39.4	9.4		14.5	29.0		9.2		22.6	40.8		9.5		20.7	50.1		8.5		23.9	59.3		
9.5	31	5.5	34.3	9.4		18.3	39.5		8.9		28.0	42.7	K	8.8		22.6	10.3	K	9.2		33.8	39.3	B	
9.0		7.1	51.6	9.3		20.1	55.7	B	9.3		34.5	57.6		8.8		57.2	43.6	K	9.5		48.2	41.9		
9.2		8.0	38.8	9.4		20.1	37.6		9.5		51.6	3.0		9.4	19	5.0	55.8		8.5	37	4.1	14.7	K	
9.5		37.1	24.4	9.1		33.0	35.7	B	9.2		53.0	31.9		9.5		14.1	22.0		8.2		6.7	24.5	K	
9.5		37.8	49.7	7.0		33.1	12.0	K	9.5	2	19.1	12.2		9.4		22.3	54.5		8.2		8.9	1.2	B	
9.2		37.8	28.4	K	8.8		55.1	37.9	K	6.5		36.0	49.5	B	9.5		28.2	25.5		9.3		21.2	43.2		
9.5		52.6	18.0		9.4		58.0	44.2		9.1		42.6	37.3		8.8	20	39.1	0.9	K	8.0		29.6	8.2	K	
9.5	32	11.6	56.0		9.5	47	29.2	9.4		9.5		42.7	45.5		6.9	21	2.1	42.2	L	9.0	38	15.2	38.9		
8.0		13.9	58.1	K	8.5		32.7	43.4	K	9.5	4	2.1	50.1		9.5		13.3	26.0		9.3		43.9	57.4	B	
9.5		33.5	49.5		9.3		35.9	50.8		9.5		19.7	52.5		9.3		19.4	44.7		9.5	39	3.6	40.3		
9.3		46.4	55.0		9.3		42.9	57.3		9.5		40.0	10.6		7.4		34.9	14.7	K	9.5		6.4	45.7		
8.3		57.5	32.9		9.5	48	12.4	52.3		9.2	5	1.8	48.5	K	9.5		45.2	10.6	B	9.5		43.7	7.1		
9.5	33	5.0	5.1		9.3		15.6	22.1		6.8		21.4	57.7	K	9.5	22	18.1	23.0		9.1		57.5	15.7		
9.5		10.0	59.2		9.5		31.7	55.2		9.0		33.0	3.4		9.4		20.7	30.0		9.0	40	5.5	58.1		
9.2		17.1	34.3		8.2		45.5	32.5	G	9.4	6	25.3	43.7	B	9.3		49.6	13.7		9.1		5.8	4.5		
7.2		17.6	58.2	K	9.4		46.0	29.4		8.3		36.5	18.1	K	8.9	23	28.7	0.8	K	8.5		19.5	54.1	K	
9.5		33.7	59.7		9.5	49	29.8	11.7		8.8	7	9.8	40.6		9.1		30.4	50.4		9.4		39.2	13.2		
9.4		35.1	22.0	B	9.5		57.7	48.2		8.5		13.1	56.4		9.5		42.3	30.5		9.5		46.7	45.2	B	
9.5		52.5	27.0		9.0	50	48.1	14.0	K	9.2		26.6	33.3		9.2		45.9	6.3		9.5		52.9	9.7		
8.5	34	10.0	14.5		8.2		53.4	33.3	K	9.4		45.2	46.1		9.5		46.2	17.7		9.2	41	19.5	1.2		
9.2		10.6	7.5		9.2		58.6	28.3	K	9.5	8	35.0	56.0		9.5	24	9.0	4.0		9.5	42	11.6	11.3		
8.9	35	1.2	13.5	B	9.5	51	23.1	32.3		9.4		59.4	41.4		9.0		28.8	2.5	K	9.0		38.4	29.4	K	
8.5		49.6	33.9	K	9.2		40.0	48.7		9.3	9	19.3	32.9		9.5		30.7	53.4		9.5		48.7	10.2	B	
9.5	36	5.4	42.4		9.5		42.2	41.3		9.1	10	0.7	58.2	K	9.1		41.7	27.0	K	8.7	43	6.8	49.9	K	
8.4		20.2	55.1		9.2	52	4.4	17.0		8.3		4.5	38.6	B	9.5	25	18.4	22.0		9.5		10.2	22.0		
9.0		36.2	29.7	B	9.5		27.0	47.2		8.6		16.1	40.6	B	9.5		39.7	36.4		9.5		34.1	17.7		
8.2		40.0	18.1	K	8.5		37.7	2.8		9.5		27.0	4.2		9.2		40.2	48.6		9.1		45.4	1.8		
9.2		40.6	8.4		8.3		47.8	23.4		9.5		32.1	7.5		9.4	26	13.6	44.2		8.5	44	51.1	29.6	B	
9.0		41.5	29.9	K	9.3	53	16.6	45.3		9.2		32.6	42.2		8.3		22.5	51.2	K	8.5	45	11.2	34.7	B	
9.3		46.8	3.6		8.4		32.7	54.4	B	8.4		37.9	41.6	B	8.3		30.2	15.2	K	8.1		27.0	29.9	B	
9.5	37	15.5	49.7		8 8		52.1	4.1	B	8.1		41.8	21.0	K	9.5		30.8	45.2		9.5		54.2	3.0		
9.3		42.8	29.9		8.7	54	6.5	58.2		9.3	11	10.2	41.6	B	9.5	27	10.4	1.4		9.4	46	27.9	21.6		
7.5		49.8	33.8	B	7.8		11.9	50.2	L	9.5		18.8	46.8		9.5		22.4	9.8		9.4	47	2.2	55.5		
9.5	38	22.5	57.3		9.5		29.1	22.0		9.5		58.0	25.3		8.9		44.2	21.6		7.0		24.3	27.0	S	
9.4		32.1	18.1		9.2		36.0	26.9	K	9.4	12	3.1	10.5		9.3		57.6	44.2		9.5		47.1	50.6		
8.9		34.8	13.6		9.5		48.4	40.8		9.1		23.9	6.1		9.4	28	3.2	51.1		9.5	48	2.2	48.7		
9.5	39	0.0	8.0		9.5	55	5.7	42.4		9.5		27.9	50.3		9.1		4.1	59.5		9.5		20.8	13.3		
8.7		20.1	46.7	K	9.2		37.4	58.8		8.8		41.7	38.1		9.3		32.7	43.7		9.2	49	4.3	6.8		
9.4		27.9	17.3		9.1		55.8	47.2		9.4		43.5	20.1		9.3		39.9	5.7		9.4		49.7	57.1		
9.5		49.2	46.2		8.5	56	4.1	37.8	B	9.5	13	0.0	6.5		9.4		51.6	3.6		8.5		50.1	25.0	K	
8.0		57.1	20.0	K	9.3		13.0	17.3	B	8.7		0.9	8.8		9.3		57.1	28.6		9.0	50	3.4	52.3	B	
8.7	40	7.9	12.2	B	9.4		26.5	6.3		8.0		3.1	25.0	K	8.8	29	5.5	55.5	B	9.5		4.2	13.6		
9.1		37.6	44.2		9.4		31.7	17.6		9.5		17.5	50.6		8.4		41.9	13.7	K	9.5		6.2	45.2		
9.5	41	2.4	53.2		9.0		48.4	12.1	K	9.5		29.7	36.4		9.5		48.6	9.6		9.5		26.9	33.4		
8.5		13.1	20.5	G	8.8	57	3.4	35.3	K	8.0		49.2	11.3	K	9.4		58.2	51.5		8.8		29.0	55.6	K	
9.5		26.0	53.5		9.5		22.5	16.5		9.2		57.9	19.7		9.5	30	43.2	59.3		8.9		31.8	56.0	K	
8.6		36.1	3.6	K	9.2		50.7	35.8		9.3	14	10.7	50.3		7.8	31	5.7	22.1	K	7.5		39.9	50.6	K	
9.1	42	7.4	12.6	K	9.3		57.8	12.6		9.5		59.2	17.2		9.4		13.6	48.7		9.4	51	21.6	59.6		
9.4		10.7	29.4		9.1		58.5	2.1		9.5	15	11.2	47.1		9.3		59.2	30.0		9.4		56.7	18.7		
9.5		56.7	51.2		9.1	58	25.3	45.7		8.4		12.9	29.5	K	9.5	32	14.4	47.2		7.5	52	11.6	26.0	S	
7.2	43	2.8	25.4	K	9.4		30.8	52.6		9.2		22.7	50.9		9.1		28.2	20.6		9.0	53	1.2	18.7	K	
9.1		30.8	22.4		7.8		42.0	2.2	L	9.5		28.7	54.4		9.5		34.9	39.9		9.3		8.8	20.5		
9.1		42.5	14.0	K	9.5		42.4	42.3		9.2		30.6	36.9	K	9.4	33	13.4	2.4		7.5		13.6	31.4	K	
9.5	44	52.5	43.7		9.1	59	24.5	9.4		9.1		49.8	5.4		9.2		32.7	25.7		9.0		13.6	3.3		
9.3	45	8.6	24.0		9.5		46.3	2.4		8.8		56.4	32.4	K	9.5	34	13.1	20.6		9.5		29.3	59.1		

801—860				861—920				921—980				981—1040				1041—1100			
	3ᵐ—4ᵐ				4ᵐ				4ᵐ				4ᵐ				4ᵐ—5ᵐ		
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	53 35.3	47.1		7.0	14 26.4	23.0	G	9.5	28 1.3	56.4		9.3	41 10.0	32.1		9.4	52 9.8	28.2	B
7.8	36.1	48.7	K	9.4	27.7	58.2		9.5	4.3	55.2		9.5	13.3	33.4		9.4	12.7	53.3	
9.5	36.9	41.2		9.5	46.0	20.8		8.8	6.8	52.9	B	9.5	13.4	8.2		9.5	53 1.9	50.4	
9.2	41.1	57.2	B	9.2	15 7.1	27.5		9.0	24.2	19.6	K	9.0	31.0	45.2		6.5	8.5	13.8	K
9.5	54 4.4	3.6		9.4	9.5	57.2		9.4	25.1	29.4		9.4	37.9	2.3		9.4	19.1	31.2	
9.5	35.7	1.7		9.5	35.5	5.6		9.5	30.6	28.1		9.4	38.5	4.2		8.8	54 7.6	23.5	
9.5	41.3	35.9		9.5	35.7	16.6		7.0	44.4	56.6	K	7.8	40.5	47.5	K	9.5	22.0	30.3	
9.2	51.8	50.8		9.5	40.5	11.1	B	9.5	53.9	32.5		9.5	42 9.1	34.6		9.1	37.7	1.6	
9.5	55 0.3	25.0		9.4	58.0	22.4		9.5	29 50.5	11.1		9.4	12.2	51.6		9.5	44.0	47.7	
9.5	21.3	24.5		7.3	16 0.2	52.9	L	9.5	30 51.4	56.4		8.6	25.9	32.1	B	8.0	46.5	40.1	L
9.0	56 43.2	5.5		9.5	17 0.9	11.5		7.1	31 21.5	51.0	K	9.5	30.3	37.9		8.8	54.2	4.9	K
9.5	57 13.7	21.6		9.5	3.7	49.6		8.6	36.2	17.2	K	9.4	30.6	51.0		9.5	55 0.1	1.9	B
9.4	52.8	46.4	B	9.5	28.3	11.6		9.5	38.9	31.6		9.4	52.1	17.2		9.4	13.5	11.2	
9.5	58 5.2	57.0		9.4	28.3	55.0		9.4	54.1	11.4		9.5	58.6	38.4		9.5	34.4	22.0	
7.5	25.9	6.2	K	8.0	18 31.5	29.0	K	9.5	32 14.0	41.8		9.4	59.8	44.1	B	9.4	37.8	43.7	
9.2	48.2	24.0		9.4	48.7	20.3		9.3	14.5	34.4		8.8	43 8.3	52.0	K	9.5	55.6	31.1	
8.8	55.8	49.9	B	8.9	51.8	24.2	B	9.5	24.4	20.5		9.5	14.0	26.4		9.2	56 9.5	33.8	
7.0	59 3.6	7.3	K	9.4	19 16.1	11.6		9.5	33 7.7	5.3		8.7	50.6	47.0		3.4	21.2	2.4	K
9.5	45.3	0.3	B	9.5	25.3	37.3		9.5	15.8	4.8		8.1	52.3	56.8	K	9.5	46.4	11.7	
9.5	55.7	39.8		9.5	35.8	57.3		9.5	31.4	28.2		9.2	59.8	55.5		9.4	57 0.0	16.5	
9.5	59.2	4.8		9.4	44.3	56.5		8.9	48.1	42.3		9.4	44 9.3	26.3		8.2	4.5	53.6	K
9.5	0 6.7	23.5		9.2	56.3	20.0		9.5	34 7.6	39.7		8.0	33.6	31.0	B	9.4	7.3	12.1	B
8.0	27.1	47.6	K	9.2	20 20.4	29.6		9.5	16.8	31.8		8.0	45 20.6	52.9	B	9.5	14.5	12.2	
8.5	51.7	49.7		8.2	53.7	39.3	K	9.5	21.6	58.2		9.4	31.6	43.1		9.5	24.7	6.2	
8.8	56.6	32.4		9.5	54.8	44.6		9.1	25.9	50.2	K	8.9	36.1	9.4		8.8	35.6	48.8	K
7.0	1 16.1	22.0	K	9.5	57.6	27.5		9.0	28.0	5.1	K	9.5	43.0	32.0		9.4	52.3	18.5	
8.0	28.6	29.0	K	9.5	21 30.0	7.4		9.5	39.2	39.5		8.9	46 13.0	15.6	K	9.4	58 2.1	15.7	
9.0	38.9	55.1		9.5	32.3	11.5		9.5	40.6	52.5		8.6	21.8	16.2	K	9.1	3.4	25.0	
9.5	2 29.7	36.4		9.4	36.1	32.2		9.5	35 26.3	41.0		9.5	27.4	51.7		9.4	11.7	11.3	
7.3	37.6	44.7	K	9.5	37.0	20.6		9.5	34.6	49.4		9.5	32.2	44.9		9.5	11.8	53.8	
9.5	44.7	37.4		9.5	40.0	42.5		9.1	40.4	3.2	K	9.5	45.9	54.3		9.2	11.9	52.8	B
9.4	3 29.9	57.0		9.5	22 25.8	6.0		9.5	50.9	24.8		9.5	47.6	51.0		9.5	12.1	52.0	
9.4	4 7.7	5.4		9.5	37.4	53.2		9.5	36 13.4	21.0		9.5	47 3.5	43.8		9.4	18.0	52.7	
9.1	37.5	56.1		9.1	23 1.4	20.9		9.5	18.7	22.5		9.4	14.4	54.5		9.5	26.8	45.2	
9.1	5 1.8	19.2		9.1	4.9	57.2		9.5	45.2	39.4		9.1	14.5	49.6	K	8.5	38.1	32.7	
8.5	33.5	34.8	K	9.2	24.0	52.3	B	7.0	55.9	2.4	K	9.5	15.8	2.6		9.1	49.0	2.0	
8.0	36.5	28.9	K	9.5	29.5	34.1		9.2	37 13.2	30.8		9.2	29.3	40.9	K	8.6	59 4.0	51.0	
8.3	57.0	14.5	K	9.3	40.6	9.2		9.4	19.8	5.3		9.5	43.7	40.2		9.4	5.3	54.2	
8.9	6 40.9	18.7		9.1	57.9	54.4		9.5	27.9	41.8		9.5	48 7.3	49.6		8.7	10.0	29.4	
9.4	53.0	1.4		9.3	24 16.2	33.8		9.4	33.1	27.6		9.0	32.0	7.0		9.4	14.4	8.0	
9.5	7 33.7	20.7		9.5	26.0	0.4		9.5	43.6	4.2		9.1	41.5	44.6		9.5	16.6	40.8	
9.5	41.6	8.5		9.4	47.8	14.8		9.5	38 6.0	29.3		8.8	44.3	12.2		8.9	17.5	30.1	
9.5	45.2	39.4		9.5	52.0	3.9	B	9.5	6.0	51.5		7.1	49 32.3	38.8	L	9.4	29.1	35.6	
6.4	8 6.9	47.3	K	9.5	25 10.2	36.6		9.5	20.2	51.3		9.2	44.5	17.3		9.5	34.2	16.8	
9.3	53.2	14.7		8.6	14.7	23.2	K	9.4	20.8	55.5		9.4	50.4	7.2		9.5	45.7	2.9	
8.0	9 2.4	11.3	K	9.5	22.4	1.9		9.2	46.3	22.6		9.5	50 10.6	17.2		9.4	57.6	7.5	
9.5	38.2	28.0		8.3	28.0	22.4	K	9.5	46.4	50.2		9.0	14.2	44.1	K	9.2	58.4	55.9	
9.5	42.3	8.4		9.5	36.8	9.4		9.4	39 36.6	22.1		9.5	34.8	48.2		8.5	0 6.2	41.9	
9.3	44.8	52.5		9.4	41.7	55.0		9.4	40.8	57.4		9.5	35.3	50.4	B	9.5	9.0	24.8	
9.4	10 8.6	47.0	B	9.3	26 8.3	49.5		8.8	44.0	28.6	K	9.4	54.3	14.5		9.4	11.7	27.0	
9.4	11.8	56.8		9.5	42.5	24.2		9.3	44.9	27.3		9.0	51 2.3	2.5		9.0	16.9	6.1	K
6.5	15.1	27.5	K	8.9	53.6	31.6	B	9.2	49.3	32.6	K	9.5	7.0	0.5		9.4	21.0	15.5	
8.0	22.0	4.8	K	9.4	54.6	48.2		9.5	54.5	43.8		8.0	9.5	47.2	K	9.4	22.8	59.6	
9.1	45.7	49.7		9.4	27 29.9	14.3		9.2	40 3.3	24.6	K	9.4	14.6	42.3		8.9	27.2	0.2	
9.3	51.0	22.0		9.4	37.0	24.4		9.4	6.1	49.2		9.4	29.3	57.0		9.5	37.4	30.7	
9.0	11 9.0	44.7		8.6	37.6	19.4	K	9.1	12.1	34.5		9.2	33.6	57.5		9.5	45.9	46.9	
9.1	20.4	23.3		9.1	40.4	29.8		9.4	42.0	14.9		9.3	43.5	55.4		9.5	1 2.1	43.5	
8.0	44.0	4.2	K	9.5	43.8	16.9		9.5	44.4	22.4		9.2	50.8	6.0		9.5	10.0	30.8	
8.7	12 32.6	30.1	K	9.0	53.9	35.7		9.4	50.8	25.0		9.2	52 0.8	55.6		9.5	10.8	33.2	
9.5	13 10.3	30.7		7.5	58.7	49.5	G	8.1	57.6	19.2	K	9.4	5.3	11.6		9.0	16.2	2.7	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	5ᵐ	+41°			5ᵐ	+41°			5ᵐ	+41°			5ᵐ	+41°			5ᵐ—6ᵐ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.1	1 27.4	58.2		8.8	11 17.5	50.8		8.8	23 51.6	39.9	K	9.5	40 16.9	53.2		9.5	53 22.0	38.6	
8.0	44.1	19.3	K	6.0	33.8	39.5	K	7.5	24 4.1	0.6	K	9.3	29.8	5.4		8.4	44.4	17.8	
9.0	46.3	22.0	K	8.8	35.4	20.6	K	9.3	11.7	7.3		9.5	35.2	9.0		8.1	52.6	11.2	K
9.5	49.0	52.2		8.3	35.7	54.5	K	9.4	19.3	34.7		9.4	39.7	1.3		9.5	54 15.1	7.0	
8.2	50.0	43.0		9.4	40.8	1.0		9.0	58.3	37.9	K	9.4	41 0.4	34.9		9.5	23.0	51.9	
8.0	2 3.5	2.2	K	8.6	44.3	52.8		8.5	25 10.7	26.0		9.5	42 15.5	13.7		8.5	29.3	1.2	K
8.7	5.8	17.2		8.7	45.4	45.9	K	8.3	28.6	12.0	K	9.5	19.0	3.0		9.4	31.4	29.2	
9.2	10.0	8.8		9.4	49.8	5.8		9.4	52.0	20.7		9.4	47.5	23.5		8.1	55 18.0	3.6	K
9.2	27.8	55.3		9.4	12 12.7	57.6		8.9	26 21.4	0.8	K	9.0	48.9	24.5		9.3	23.8	13.8	
8.8	35.8	28.9	B	9.3	27.8	40.1		8.3	39.2	10.4	K	9.5	50.2	24.4		9.3	56 12.7	57.3	
8.6	43.8	24.9	K	8.8	37.7	57.9	K	7.3	49.9	44.1	S	9.5	43 19.7	29.9		9.0	18.6	37.5	K
9.2	58.4	32.4		9.5	42.1	20.3		9.4	27 0.4	51.6		9.2	25.0	21.6		9.5	34.8	15.4	
9.4	58.9	48.7		9.2	59.1	10.5		9.0	7.2	55.7		9.5	39.1	17.8		9.5	37.4	54.2	
8.4	3 5.5	45.1		9.4	13 21.8	4.8		9.4	39.5	5.0	B	9.3	43.9	33.1	B	9.0	44.0	46.5	K
8.4	13.4	8.3	K	8.7	22.5	27.4	K	9.2	28 14.6	45.6	B	9.3	50.7	27.1		9.5	44.3	39.5	
8.2	29.0	3.3	K	9.3	27.0	7.4		9.3	15.4	5.3		9.1	44 2.6	55.8		8.5	57 7.0	12.1	K
8.2	30.0	27.4	K	9.5	54.1	29.9		9.5	22.9	50.7		9.5	15.5	8.9		6.3	8.0	51.8	K
9.5	50.4	58.6		9.5	14 4.8	57.8		7.0	25.5	45.2	L	9.2	20.6	1.0		9.4	8.6	44.9	
9.4	4 0.9	3.6		9.4	8.9	48.0		9.5	47.9	26.0		9.4	55.4	55.0		9.4	26.0	42.0	
9.2	7.6	2.9		9.0	13.2	46.0	K	7.0	54.4	16.2	K	9.1	45 6.0	6.5		9.5	27.1	6.4	
9.1	14.3	43.1	K	8.2	15.0	40.9	K	9.3	58.8	39.8		9.5	13.5	46.0		9.5	28.2	36.8	
9.4	32.1	17.9		9.5	22.0	25.5		9.5	29 8.4	57.2		9.2	31.0	34.5		9.5	50.4	59.8	
9.5	35.2	12.7		9.5	34.3	7.7		9.3	42.3	15.2		9.3	41.0	29.9		9.4	58 1.0	45.2	
8.1	38.5	9.9	K	9.4	54.4	53.3	B	9.3	50.9	28.7	B	7.0	41.2	17.5	G	9.4	4.7	18.1	
8.9	5 8.3	44.8	K	9.5	15 13.8	50.0		9.5	56.8	21.3		9.0	50.0	0.3		6.7	8.2	4.2	K
9.2	17.5	31.9		9.5	29.0	2.8		9.3	57.4	19.2	K	9.0	56.0	40.9		9.5	16.4	47.2	
8.1	20.0	40.7	K	9.4	33.3	29.4	B	9.5	58.5	26.2		9.0	56.5	44.1		9.3	31.7	6.5	B
9.3	32.1	5.2		9.4	33.9	29.8		9.4	30 3.0	24.3		9.3	46 20.7	36.7		9.3	43.4	47.6	
9.0	43.1	15.5		9.5	16 17.6	30.0		9.5	45.3	2.5		9.1	22.2	23.6		7.7	47.8	33.8	
9.2	48.7	44.0	K	9.4	18.5	3.1		8.8	48.1	16.6	K	8.8	23.3	43.0	K	9.5	59 5.5	45.6	
9.4	55.8	38.6		9.1	38.0	37.4	K	9.5	50.0	41.7		9.0	44.0	57.0	K	7.5	15.4	15.5	K
9.3	6 13.9	57.8		9.2	44.3	41.0	R	9.4	32 15.7	7.8		9.1	45.4	9.2	K	8.8	26.7	34.1	K
9.0	24.6	8.3	K	9.4	17 12.6	36.6		9.1	16.0	40.5		9.4	58.1	59.3		8.8	33.9	22.3	K
9.5	34.2	50.5		9.4	51.5	2.3		9.5	25.3	40.3		9.3	47 0.0	30.0		9.1	49.0	0.3	
8.8	36.4	57.4		9.4	55.7	42.4		9.5	42.2	56.9		9.5	35.9	38.2		8.5	49.2	4.7	
9.5	7 22.1	20.7		9.5	18 1.4	42.1		7.0	56.1	37.5	K	9.5	37.0	26.6		9.2	58.0	8.1	
8.6	29.0	51.8		9.5	23.9	12.6		7.3	33 3.3	2.8	K	9.5	48 7.1	59.0		9.2	58.6	57.8	
8.5	31.6	38.4	K	9.5	58.5	26.4		9.2	15.7	22.9	K	8.6	11.9	55.0	K	8.6	0 19.3	9.8	
8.8	33.5	42.1	K	9.1	19 15.0	19.0	B	9.3	51.6	36.5	B	8.1	13.2	44.4	K	9.2	21.4	12.9	
9.1	35.0	20.3		9.4	23.8	23.7		9.5	54.1	42.8		9.5	23.4	34.3		9.0	36.0	7.6	K
9.3	44.1	2.3		9.3	25.5	29.6		9.5	34 10.0	8.1		9.5	41.8	11.8		9.5	39.5	44.4	
9.5	48.8	36.3		8.9	54.4	2.4	K	9.1	20.3	45.4	K	7.5	49 4.3	53.8	K	9.5	43.3	57.2	
8.0	8 6.4	57.0	K	9.0	56.1	38.2		9.5	31.3	17.6		9.5	6.6	17.0		7.5	48.6	14.8	G
9.4	7.3	46.3		9.4	58.3	29.1		9.5	54.0	47.5		8.8	40.1	37.4		7.8	54.7	56.8	K
9.5	46.0	21.0		7.6	59.6	10.0	K	9.5	35 26.3	4.6		8.8	42.4	38.3	B	8.2	1 5.5	27.1	K
9.3	9 2.5	59.9		6.7	20 34.4	20.2	L	9.0	44.9	7.3		9.5	59.2	54.3		9.2	36.5	44.1	K
9.5	11.0	57.3		9.3	36.7	2.9		9.4	45.3	26.5		9.4	50 46.8	16.9		9.3	41.4	26.7	
9.5	17.4	50.7		9.4	53.1	55.0		9.0	49.5	10.2	K	9.4	47.3	37.5		9.5	59.2	59.7	
9.5	25.7	12.5		9.5	21 5.7	45.0		9.3	59.3	40.8		7.9	47.3	55.1	K	9.5	2 36.1	32.4	
9.5	26.5	58.1		9.5	14.1	23.3		9.5	36 14.8	35.2		9.5	51 10.7	48.0		9.3	54.0	25.5	
9.5	29.3	5.0		9.3	31.9	12.7		9.5	45.2	52.3		9.4	15.2	9.1		9.4	3 5.7	58.8	
8.1	30.6	3.2		9.5	47.4	31.9		9.2	37 13.2	22.6		8.7	19.0	9.2		7.3	25.0	43.9	K
9.4	34.8	19.9		9.5	54.3	24.5		9.1	23.5	2.5		9.4	20.0	10.8		9.4	26.2	59.2	
8.7	39.3	4.7		9.0	56.0	43.8		9.5	46.5	14.4		9.4	29.6	58.4		8.0	38.8	29.6	K
9.3	46.9	33.8		9.3	22 33.8	11.9		9.3	38 14.3	45.8		9.5	52 17.3	32.5		9.0	4 6.3	26.0	
9.4	10 3.9	47.1		9.4	48.9	35.0		9.4	41.9	28.3		9.3	30.9	41.8		8.0	31.7	47.2	K
9.3	11.5	7.7		8.5	52.8	31.8		9.0	39 19.4	42.1		8.4	32.3	21.9		9.5	45.2	33.5	
8.4	20.7	15.5		6.8	23 10.2	59.9	K	9.5	28.9	42.7		8.1	47.4	57.6	B	9.5	49.1	44.8	
9.5	36.9	56.9		9.5	11.1	35.7		9.5	47.1	47.9		9.3	53 6.8	5.2		9.0	5 7.0	20.7	K
9.5	58.0	39.2		9.0	47.1	57.2		9.3	51.3	3.1		9.5	22.0	8.0		9.4	27.9	54.2	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	6ᵘ		+41°		6ᵘ		+41°		6ᵘ		+41°		6ᵘ—7ᵘ		+41°		7ᵘ		+41°
m	′ ″		′	m	′ ″		′	m	′ ″		′	m	′ ″		′	m	′ ″		′
9.5	5 41.3		5.0	9.4	23 46.9		32.3	9.4	38 27.4		17.1	8.9	53 41.3		33.4	R	8.9	12 3.0		23.3	
9.1	46.6		33.5	K	9.5	24 2.4		53.2	9.0	29.5		13.5	K	9.3	54 12.4		49.2		9.0	24.5		40.8	B
9.3	58.1		27.3		9.4	6.3		35.0	9.5	33.4		5.7		9.3	14.9		50.0	B	8.9	25.0		49.5	
9.3	6 1.7		18.4		9.2	18.5		36.2	9.1	47.9		55.1		9.5	55 10.0		39.7		9.2	37.7		15.4	
9.3	15.9		51.0	B	9.5	19.5		39.7	9.3	39 2.0		32.9		9.3	36.8		47.1		9.5	13 21.2		11.1	
9.4	23.4		2.8		9.2	19.8		9.3	K	9.3	2.4		1.4		9.4	41.7		14.0		7.3	23.2		40.2	K
9.2	27.1		50.1		9.5	26.6		23.0		9.5	3.0		36.1		9.3	47.3		12.8		9.3	44.3		12.5	
9.5	44.5		6.2		9.0	32.7		48.3	K	9.3	19.6		45.5		9.2	59.8		18.0		9.1	14 18.8		53.7	
9.1	7 19.3		14.3		9.3	25 15.4		25.0		9.5	27.7		49.6		9.0	56 27.0		1.2		9.2	47.7		25.5	
8.0	22.0		31.0	L	9.2	22.0		5.7		9.4	30.0		39.6		8.8	28.5		22.8	R	8.9	15 1.4		18.8	
9.3	58.4		12.5		8.7	26 2.6		55.2	K	9.3	44.7		11.0	K	8.0	39.4		30.7	R	9.5	57.9		45.6	
9.3	9 1.2		2.1		7.8	36.1		13.1	K	8.9	47.6		9.2	K	9.5	41.5		41.7		9.5	16 4.7		5.8	
9.5	2.6		2.6		9.5	38.4		53.6		9.5	40 19.2		26.5		9.2	57 38.0		8.1		9.1	38.2		2.3	K
9.4	12.0		2.4		9.2	27 12.5		10.2		9.5	22.1		53.6		8.7	46.2		51.7	B	9.2	38.8		23.8	
8.0	20.6		8.8	K	9.5	29.9		32.1		9.5	23.5		16.7		8.2	47.7		27.3	K	9.4	40.5		30.3	
9.5	10 5.4		43.4		8.4	31.6		23.6	K	5.2	30.5		56.8	K	7.8	48.8		1.5	K	9.0	17 42.4		30.3	K
9.5	12.3		21.4		9.3	39.0		40.7	B	8.9	43.4		45.4	K	9.3	53.9		33.8		9.5	48.1		57.5	
9.3	29.7		24.7		9.5	46.6		2.8		9.5	43.9		14.5		9.3	58 20.9		40.7		9.0	18 17.8		10.0	B
9.5	43.1		36.8		9.2	47.7		13.2		9.4	47.3		20.2		9.5	31.8		2.0		8.7	19.7		39.8	
9.5	44.6		46.7		7.0	28 25.0		41.9	K	9.5	41 1.4		54.3		9.5	59 8.0		40.2		9.3	27.2		15.5	
9.4	11 28.0		14.3		9.5	25.4		55.2		9.0	1.6		10.7	K	8.6	13.0		51.9	K	9.5	39.9		35.3	
9.4	39.5		33.4		7.5	44.6		37.4	K	9.4	10.4		55.8		9.1	15.1		25.9	K	9.5	19 1.8		41.2	
9.5	12 31.8		17.8		9.0	29 35.5		23.6		9.5	15.7		46.1		9.1	15.5		29.8	K	9.5	15.6		55.1	
9.5	52.4		4.1		7.0	30 10.4		5.6	S	7.7	19.9		2.1	B	9.3	23.5		44.7		9.2	44.0		38.3	
9.5	53.6		27.2		8.5	25.9		33.4		9.5	23.1		33.5		9.5	0 18.3		51.2		9.5	44.3		32.8	
9.3	13 11.4		14.5	K	9.5	45.3		2.3		7.8	37.8		43.8	K	9.4	33.6		20.0		9.3	54.4		26.5	
9.4	15.7		40.0		9.2	31 15.8		5.2		9.5	42 9.2		3.3		9.4	1 5.3		28.8		8.8	59.1		30.6	B
9.5	26.5		26.8		9.1	47.7		1.9	K	9.4	58.2		15.1		9.5	34.5		9.7		9.2	59.4		33.8	
9.0	30.2		2.8		9.5	32 19.5		51.7		7.4	44 1.2		3.6	K	9.4	2 0.8		1.2		6.7	20 10.0		9.5	L
9.1	31.6		59.7	K	9.0	36.2		43.8	K	9.1	28.3		53.7		9.0	13.2		21.1		7.8	12.2		53.5	
8.5	14 9.2		52.7	K	8.5	33 19.7		25.0		9.4	33.5		2.3		9.4	20.2		26.8		9.5	25.3		40.7	
9.4	20.7		37.9		9.0	50.3		1.2		9.0	34.2		45.3	K	9.4	22.9		55.8		8.6	34.2		32.8	B
8.3	26.1		10.0		9.5	34 10.6		4.9		9.3	45 33.6		1.3		8.5	24.7		25.8	K	9.0	37.6		3.7	
8.5	33.4		21.6		9.5	18.7		2.6		8.0	45.7		25.0	K	9.2	44.3		46.2	K	9.1	38.9		15.0	
8.7	15 1.6		14.4		9.4	22.5		46.3		9.0	46.1		44.8		9.2	47.2		50.1		8.0	21 39.2		45.5	K
9.5	21.7		51.3		9.4	35 34.6		58.7		9.3	47 5.8		17.5		9.4	3 13.3		17.5		9.3	44.3		11.8	
8.4	39.6		39.5		7.6	47.6		55.1	B	7.0	34.1		1.2	K	9.2	35.7		26.4		9.5	22 48.7		8.2	
9.0	47.6		39.3		9.4	56.1		33.4		6.6	41.0		53.5	K	8.0	4 12.3		26.8	K	9.5	23 31.6		15.7	
8.4	53.6		8.5	K	9.5	36 29.3		55.6		9.4	49.6		39.9		9.5	39.6		58.2		9.3	42.4		51.7	
8.9	16 58.1		15.0	K	9.0	32.0		46.6	K	9.5	48 45.2		40.9		9.5	45.4		25.8		7.9	43.5		28.3	K
9.4	17 3.1		52.8		8.5	42.2		19.6		9.5	49 35.5		12.0		9.3	5 13.4		33.7		9.5	24 46.4		47.9	B
9.3	3.6		21.5		8.8	49.2		51.6	K	9.5	47.4		17.1		8.1	33.6		37.3	R	9.2	48.8		35.5	K
9.4	9.3		16.6		9.5	56.4		7.7		9.5	59.9		49.7		9.5	6 32.4		45.6		7.6	49.6		10.8	K
9.0	18 1.6		53.0	K	9.1	37 19.5		12.6	K	8.2	50 9.5		12.2	R	8.9	34.5		7.0		9.4	25 2.1		24.9	
9.0	8.3		42.3		9.5	31.5		21.8		9.3	15.0		39.3	B	9.5	39.8		32.3		9.5	3.6		28.7	
8.9	40.0		16.3	K	9.3	38.3		7.5		9.5	15.0		47.1		9.3	40.2		51.8		8.8	16.7		46.6	K
9.3	59.7		29.4	K	9.4	40.9		18.1		8.7	42.6		27.5	K	9.4	7 31.3		51.1		9.3	26 41.6		2.7	
9.5	19 41.0		5.9		9.4	44.8		19.6		9.3	55.0		53.2		7.5	35.2		11.6	K	9.2	51.1		9.0	
9.5	48.6		23.0		9.5	55.0		13.4		8.7	51 16.2		23.5	K	9.3	57.6		46.6		9.2	59.8		19.2	
9.2	50.5		55.8	K	9.5	38 2.5		19.7		9.4	42.9		52.0		6.0	58.2		7.5	K	9.5	27 15.4		36.2	
7.0	20 10.2		29.4	K	9.0	2.5		13.4	K	9.5	46.2		53.7		8.9	8 13.6		39.9		7.8	20.4		10.6	K
9.0	16.1		25.2	K	9.0	5.0		14.0	K	9.5	49.5		55.0		9.4	15.5		18.9		8.5	22.3		5.1	K
9.5	16.6		2.6		8.0	8.0		27.3	L	9.1	54.6		12.9	B	9.3	9 44.8		15.0		9.3	28 20.6		33.4	
9.5	37.7		29.0		8.9	8.4		14.1	K	9.2	56.7		14.6		8.8	10 26.7		31.8		9.3	28.8		34.7	K
9.4	56.0		28.9		9.3	10.7		32.7		8.0	52 18.7		50.9	K	9.4	40.7		2.4		9.2	37.1		58.9	
9.5	21 41.6		58.8		8.5	10.8		7.1	K	9.2	36.6		55.2		9.0	53.2		33.2	K	9.5	38.2		16.8	
9.5	59.3		33.5		9.1	15.0		14.2		9.5	48.3		24.5		9.3	56.8		21.8		9.5	38.8		28.4	
9.5	22 16.6		20.4		9.5	18.6		15.9		9.3	53 6.6		43.8		8.9	11 29.7		56.2		9.3	42.2		43.4	
9.5	21.4		57.7		9.4	22.4		14.5		9.2	23.7		40.9		7.5	54.2		34.8	K	6.6	30 12.8		29.5	L
9.3	23 24.4		19.1		9.5	24.7		15.4		9.0	26.6		50.8	K	9.4	54.5		56.7		9.5	15.6		24.8	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	7ᵘ	+41°			7ᵘ—8ᵘ	+41°			8ᵘ	+41°			8ᵘ—9ᵘ	+41°			9ᵘ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	30 19.1	29.2		9.5	49 4.1	53.6		9.3	12 18.0	20.7		9.4	44 12.7	2.7		8.8	7 7.8	18.8	
9.5	20.5	25.1		9.5	7.1	54.0		9.5	13 2.1	29.2		9.5	45 20.0	25.1		9.1	46.3	16.5	K
9.5	31 39.0	28.8		8.8	15.0	14.6		8.8	10.2	13.3		9.5	46 13.5	40.9		9.3	52.0	14.3	
9.1	40.9	1.8	K	7.0	50 11.5	48.5	L	9.4	14.8	24.4		9.0	14.8	12.8		8.9	52.1	11.8	B
8.1	32 2.1	49.1	K	8.0	24.8	11.1	K	9.5	39.9	38.5		9.5	47 22.8	42.3	B	9.4	8 42.4	53.9	B
9.5	24.1	7.1		9.3	54.7	21.2		8.3	56.3	7.8	K	9.5	31.1	23.0		9.5	9 1.4	28.4	B
9.4	34.2	33.3		9.3	51 10.0	42.0		9.0	14 2.5	54.0		9.5	35.2	15.0	B	9.5	55.5	1.8	
9.2	38.7	52.1	K	9.5	16.6	8.2		9.5	15.5	19.1	B	9.5	40.2	41.5		8.8	10 33.1	34.2	L
9.5	54.2	17.2		7.4	30.6	15.7	K	9.5	31.3	23.1		8.2	41.1	53.6	B	9.1	51.6	35.0	K
9.3	33 14.8	35.7		9.4	32.3	36.6	B	9.5	40.0	0.3		9.5	58.2	37.6		9.5	11 22.2	35.8	B
9.5	22.4	42.6		7.0	37.0	48.0	L	9.5	44.6	25.8		9.1	48 10.0	48.1		9.0	44.4	10.8	
9.1	30.7	16.7		9.5	40.1	53.5		9.5	17 10.4	12.3		8.8	27.5	21.7	K	8.5	12 9.2	1.6	K
9.0	51.3	2.0	K	9.2	43.0	1.2	K	9.1	19.5	11.0		9.5	49 7.2	2.2	B	9.4	11.4	9.1	
9.5	53.0	21.0		9.5	56.2	5.2		9.5	23.0	34.3		9.5	35.1	44.9		9.5	14 2.0	39.2	
9.5	34 0.5	24.0		9.4	52 44.2	56.9		9.3	57.0	4.1	B	8.5	36.1	34.2	K	9.0	40.9	23.7	
9.2	58.1	4.2		9.5	53 24.5	32.9		9.5	18 3.9	54.5		8.4	42.0	28.6	K	8.5	15 47.0	47.2	K
8.0	35 2.6	31.8	K	9.0	55.6	7.6	K	9.5	10.8	27.3		9.5	42.7	51.7		8.3	47.2	28.4	K
9.5	16.7	2.2		9.5	58.0	20.6		9.4	19 2.5	56.0		8.6	50 15.6	54.0	K	8.5	16 34.1	49.7	K
9.3	22.3	57.0		8.8	54 49.4	33.5		9.5	4.3	14.3		9.5	52 0.6	19.3		9.3	17 17.0	11.8	
9.5	36 19.4	5.4		7.5	55 32.7	35.4	K	9.5	40.1	8.3		9.4	4.3	0.4		9.5	24.0	43.8	
9.5	40.3	14.2		9.4	56 47.1	13.2		9.0	20 4.6	11.8	K	7.7	9.4	30.7	K	7.3	38.0	39.3	K
9.3	44.2	25.1	K	9.4	56.8	22.5		9.5	12.5	19.8		9.2	16.0	56.2		9.3	18 21.7	7.5	
8.9	37 9.5	47.8		9.4	57 42.2	24.1		9.0	34.3	14.8		9.4	24.6	49.5	B	7.3	28.3	49.2	K
9.4	36.8	25.1		9.2	58 5.4	53.2		9.1	44.8	24.9		8.9	53 27.5	52.2	K	9.1	19 3.8	12.5	B
9.1	38 11.4	9.3		9.4	41.5	24.8		9.5	21 0.6	4.3		9.2	42.4	59.9		9.5	18.4	59.2	
9.4	17.8	31.2		9.1	44.3	54.0		9.3	4.6	46.6		8.8	46.1	8.1	K	8.4	57.8	45.3	K
9.4	18.4	22.4		8.8	59 1.0	34.5		9.5	22 43.2	24.6		9.0	54 13.0	36.5		9.0	20 1.9	16.3	B
8.0	27.5	57.5	K	9.0	14.3	3.1	K	9.2	51.4	38.5		9.0	14.6	39.3	B	7.5	14.1	4.8	K
9.5	39 12.0	1.7		9.0	26.6	20.2		9.4	54.8	56.3		9.0	47.5	14.3		9.4	21 10.0	43.1	B
9.5	22.4	1.3		9.1	34.2	3.7	B	8.9	23 35.0	11.6		8.5	49.7	6.2	K	9.0	44.1	12.2	
8.7	31.9	49.5	K	9.5	45.3	9.4		9.2	24 36.5	47.0		8.5	51.5	54.8		8.7	48.6	16.3	L
9.3	40 47.5	29.8		8.9	0 2.2	9.4	B	9.5	25 6.9	56.2		8.7	55 4.7	11.4	K	9.2	25 31.1	32.3	B
9.4	41 24.3	9.7		9.2	29.1	14.2		7.0	23.4	30.6	K	8.5	14.0	57.2		9.4	26 17.2	14.5	
9.2	25.2	18.4	B	9.3	1 58.7	27.5		9.3	26 26.5	58.2	B	9.1	56 39.5	37.4	K	9.2	29.0	43.4	
8.5	56.4	39.1	K	9.2	2 13.8	20.2		9.1	55.4	41.0		9.2	47.0	42.8	K	9.3	41.0	19.0	B
9.3	42 15.6	34.6		9.3	16.1	7.2		9.5	59.8	0.6		9.3	54.8	11.2		9.5	27 1.4	55.6	
8.4	16.0	30.5	K	8.5	19.5	47.9	K	9.1	27 8.0	54.0	K	9.4	57 28.2	32.5		9.1	7.0	42.8	
8.8	21.4	28.1	K	9.5	3 12.0	33.0		9.2	35.9	51.2	K	9.0	58 27.0	50.8	K	9.5	28 37.9	34.1	
9.2	30.0	15.7	B	8.5	13.5	58.9	K	9.3	46.1	20.3		9.5	36.0	35.8		8.5	41.2	26.4	K
8.0	32.1	54.8	K	8.2	57.2	8.7	B	9.2	28 23.3	52.3	B	9.5	37.0	26.9		9.5	59.1	51.3	B
8.9	43 22.2	0.4		9.5	4 34.6	8.7		9.5	31.0	13.1		9.0	55.0	5.8		9.0	29 2.8	13.3	
8.4	53.4	23.2		9.5	45.2	46.8		9.5	49.7	30.8		8.5	59 3.0	44.2	K	9.4	35.2	53.4	
9.5	44 22.1	2.0		9.4	55.2	47.3	B	9.4	29 32.0	35.2		9.5	34.8	30.3		9.5	51.0	53.2	
9.5	25.0	33.1		7.3	5 8.3	0.8	K	8.0	30 12.2	53.0	K	9.0	0 7.6	3.8		9.2	30 5.4	50.5	B
9.4	56.6	14.1	B	7.6	11.8	34.1	K	9.2	30.8	48.3		9.5	30.2	46.4		9.5	14.1	46.7	
9.5	58.9	33.6		9.3	42.8	10.0	B	9.0	36.4	35.9	K	9.0	41.1	9.2		9.5	48.8	21.7	
9.1	45 10.5	2.5		9.5	49.4	2.4		9.5	31 17.0	52.0		9.1	51.0	47.8	B	9.4	55.8	54.1	
9.0	11.0	56.9	K	9.5	6 22.3	7.2		9.3	40.5	21.0		9.5	1 36.0	47.3		8.8	31 24.3	43.8	
9.1	48.5	43.9		9.3	25.5	9.7		9.2	33 0.9	33.2		9.5	2 9.3	12.7		9.5	25.9	30.2	
9.4	54.9	7.8		8.5	56.3	19.2		9.0	34 54.8	27.9	B	9.3	23.8	34.1		9.5	47.4	2.8	
9.2	46 40.4	11.3		9.5	7 24.1	12.7		8.2	37 53.9	2.8	K	9.4	3 14.3	18.1		9.2	32 18.5	9.8	K
9.4	54.0	53.5		9.2	8 42.0	26.1		8.5	38 19.5	44.0		9.0	20.7	19.4	B	9.1	27.3	5.4	
9.5	57.1	14.6		8.5	9 30.2	18.7	B	9.2	20.2	37.5		9.4	44.9	17.8		9.5	48.6	22.8	
8.5	58.3	21.1		8.7	10 7.4	0.2	K	8.4	35.7	27.6	K	8.0	45.8	28.8	B	8.8	33 3.0	35.4	K
8.2	58.7	26.6	B	9.5	26.6	34.2		9.0	39 24.7	36.7	K	9.5	4 4.7	6.4		9.4	7.9	22.8	B
8.4	47 12.4	32.1		9.1	11 1.3	0.6	K	8.0	28.7	36.9	K	9.5	31.7	26.3		8.0	26.7	38.7	K
9.0	42.5	41.0		9.5	23.4	16.8		7.5	41 29.6	27.9	K	9.5	6 0.8	22.1		8.8	27.0	30.0	K
8.2	58.6	22.1	K	9.5	35.0	23.7		9.5	35.0	40.6		9.0	37.2	43.8		9.1	34 28.0	30.9	K
9.5	48 56.1	53.0		8.9	38.6	14.9		9.2	43 27.3	0.6		9.5	51.5	33.9		9.0	31.0	5.0	K
9.1	49 4.0	51.0	K	9.5	12 17.7	3.5		9.5	43.8	24.8		8.1	52.2	24.5	B	9.0	35 25.1	26.5	K

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	9ʰ—10ʰ	+41°			10ʰ	+41°			10ʰ—11ʰ	+41°			11ʰ	+41°			11ʰ—12ʰ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	35 56.2	39.7		9.3	1 21.8	44.7		7.7	38 58.5	28.4	K	7.2	13 40.4	14.9	K	8.5	44 54.9	7.6	K
8.9	36 4.0	49.6		9.3	2 8.0	34.8		9.2	39 16.9	58.4		8.2	42.8	5.4	K	9.2	45 25.8	6.5	B
9.3	25.1	53.2		6.5	14.9	22.6	K	7.0	42.9	51.3	K	7.6	14 5.4	49.2	B	9.4	26.0	0.4	
8.6	41.9	44.4	K	9.5	3 56.9	11.0		9.1	48.3	32.7		9.4	15.8	36.3		6.5	46 18.3	42.6	K
9.5	55.7	28.3		9.5	6 20.8	18.6		8.0	40 4.5	54.3	K	9.5	15 5.9	26.1		9.4	47 2.1	33.3	
9.0	37 4.8	22.1		7.3	7 55.7	59.7	K	9.3	15.6	2.8		9.3	16.5	44.9		9.5	35.2	33.2	B
9.2	32.4	45.2	K	9.5	9 44.3	45.2		9.0	41 13.4	39.8	B	9.4	44.6	39.1	B	9.4	48 4.6	28.4	
9.5	36.0	2.4		9.5	46.0	22.5		9.4	18.8	47.9		7.5	17 54.2	43.9	K	6.9	32.2	27.4	B
9.4	38 18.8	40.8		9.4	10 46.4	35.0		9.5	23.6	44.8		9.3	18 7.9	3.0		9.3	49 9.7	31.2	
9.5	38.2	28.1		9.2	11 13.1	47.7	B	9.5	47.9	49.5		9.0	19 48.2	0.7	K	8.5	9.8	51.0	K
8.4	39 20.7	13.0	K	8.4	23.0	13.1	K	9.0	43 32.1	25.7	K	9.3	54.9	19.5	K	8.5	23.8	9.7	B
8.2	40 5.3	44.2	K	8.0	44.2	51.7	K	9.3	44 0.4	9.8		9.1	20 12.8	36.4		7.0	36.9	5.2	G
9.5	17.4	35.3		8.5	12 26.8	55.7	K	9.4	20.6	24.8		9.4	14.5	41.3		6.5	45.9	9.7	G
9.2	48.2	52.7		9.5	38.7	17.1		9.5	49.2	44.4		9.1	36.8	17.8	K	9.5	52.3	49.6	
9.4	41 58.8	15.0	B	8.6	13 23.6	38.9		9.5	52.1	28.3		9.5	54.3	10.5		8.7	53.8	42.6	K
9.4	59.4	4.7		6.5	33.2	56.9	K	9.5	45 12.1	24.8	B	7.2	21 6.3	58.8	G	9.5	50 19.3	45.1	
8.9	42 41.1	35.3		9.4	38.5	26.3		9.5	48.3	25.0		9.2	43.8	27.5	K	9.2	24.9	38.5	
9.0	55.3	52.7		8.7	15 4.9	54.4	K	9.2	46 20.2	35.7		9.4	22 38.8	34.1		9.5	37.7	14.5	
9.5	59.2	32.9		9.5	5.2	31.9		9.4	48 2.7	0.9		9.3	56.5	49.2	B	9.0	44.0	5.6	
7.8	43 19.0	38.6	K	8.7	30.1	18.7	K	9.4	8.4	53.6		9.5	56.5	52.0		9.5	52.2	16.6	
7.8	38.7	3.7	K	8.2	40.1	23.2	K	9.4	14.2	1.5	B	9.2	23 50.3	18.6	K	9.0	51 56.9	51.0	
9.5	45 6.4	58.7		8.9	42.4	12.3	B	9.4	37.9	17.8		9.4	25 3.8	54.5		9.3	59.8	57.5	
9.3	29.5	46.1	B	9.5	50.6	34.4		9.3	49 40.0	1.4		9.4	4.9	30.3	B	8.8	52 41.9	6.1	K
9.0	39.4	4.6		8.9	52.7	43.6	S	9.5	50 6.8	25.9		9.5	40.7	59.9		9.5	54 28.6	34.1	
9.5	41.6	2.9		9.5	58.5	15.8		9.5	36.2	27.3		9.4	26 44.8	39.5		8.0	55 33.9	52.3	B
9.5	46 7.9	4.0		9.0	59.6	47.0	B	8.3	51.3	44.9		9.3	27 0.3	25.6		9.4	54.6	11.1	
9.2	8.2	36.3	K	9.3	16 5.9	59.4		4.8	51 19.4	12.4	K	9.1	28 19.4	5.6		9.5	56 4.0	42.1	
9.4	39.0	19.6		9.5	11.8	54.9		9.0	31.3	55.9		9.3	26.7	27.2		8.5	8.6	39.2	R
8.8	47 1.1	57.3	K	8.3	17 5.9	38.6	K	9.5	52 7.4	16.0		9.3	26.7	22.9		8.4	49.0	58.1	K
9.1	58.8	13.4		9.4	18 37.7	18.1		9.4	36.9	28.8	B	8.7	29 22.9	28.4	K	8.9	58 19.2	57.4	B
9.5	59.7	9.4		8.8	44.6	27.6	B	9.5	43.1	22.8		8.8	27.5	15.5	B	9.4	40.8	33.5	
8.6	48 33.1	53.6	K	8.9	54.2	21.4	K	8.7	53 6.7	21.8	B	8.5	28.6	53.5		9.4	41.5	44.6	
5.2	49.5	45.1	K	7.5	19 9.8	56.9	L	8.5	29.5	33.0		9.3	39.7	33.8		9.1	0 14.0	47.5	
7.7	49 31.1	25.6	L	9.0	21.2	0.4	K	9.5	54 21.0	36.0		9.2	30 21.5	34.7	B	9.1	1 14.9	27.6	K
8.5	50 31.0	16.6	K	9.5	35.9	48.0		8.4	57.0	17.8	K	9.1	25.8	53.0		9.5	2 4.3	16.1	
8.5	47.0	49.3	L	9.3	20 22.3	37.3	K	9.2	55 11.9	9.9		9.2	44.9	31.6		7.2	19.4	3.2	G
8.7	49.5	24.4	K	7.5	21 33.1	13.3	G	9.1	13.1	3.9		9.0	31 10.3	51.4	K	9.2	4 28.8	38.6	K
9.5	51 57.2	20.6		8.7	22 35.4	9.9	K	9.5	56 50.8	38.7		7.0	14.4	3.1	K	9.0	5 2.0	12.7	
9.4	52 58.9	30.2		9.5	23 8.0	53.0		9.5	57 50.0	52.8		8.0	15.3	58.0	K	9.5	31.4	22.1	
9.1	53 10.9	45.9	B	9.5	24 12.3	27.5		8.5	58.9	42.4	K	9.3	21.0	30.5		8.4	38.4	3.2	
9.5	27.0	16.7		5.2	47.3	9.4	K	9.5	58 58.3	12.1		9.1	32 9.9	12.7		9.3	6 55.5	38.4	
9.5	39.9	22.5		9.3	25 30.9	18.4	B	9.5	59 14.0	42.4		9.4	39.0	39.2		9.5	7 12.4	48.7	
9.5	54 4.0	26.5		9.2	45.6	27.4	K	9.5	53.8	35.1		9.0	33 27.9	50.5	K	9.5	8 36.9	2.2	
9.5	17.7	15.7		9.5	26 38.0	20.3		8.5	0 52.8	57.8	K	9.5	53.6	26.1		5.5	51.5	28.1	K
8.7	50.5	21.4	L	7.5	44.7	37.4	K	9.5	2 4.5	20.1		9.5	34 42.4	16.1		9.5	10 51.8	55.6	
9.4	55 5.6	9.2	B	9.5	29 43.9	47.5		9.5	3 39.8	52.9		9.0	45.3	51.6		9.0	11 21.3	35.0	
8.1	43.0	21.9	B	8.0	44.1	10.3	K	9.0	50.6	33.1	K	8.5	35 2.3	41.8		8.2	24.2	43.5	K
9.3	54.7	26.2		9.2	30 7.6	31.1		8.4	4 34.0	19.5	K	9.5	38.9	11.6		7.2	53.2	7.4	K
8.9	58.2	32.2	B	8.3	11.1	4.8	K	9.2	39.3	18.6		9.1	37 39.0	36.5		7.8	12 20.4	45.6	K
7.3	56 53.8	44.3	K	8.5	31 44.6	22.3		6.2	5 37.2	52.8	K	9.2	38 18.3	18.6		8.5	14 40.3	31.4	L
9.0	57 18.7	24.7	L	8.2	46.5	3.0	K	9.1	7 28.8	45.9		9.4	39 30.7	43.5	B	9.0	15 11.3	35.8	
8.1	21.4	47.8	K	9.3	32 17.0	40.6	B	8.6	8 8.9	19.8	K	8.8	40 25.0	28.6	K	7.5	16 44.6	32.1	K
9.0	25.3	52.1		9.5	26.1	18.8		9.2	9 7.8	41.0		9.3	48.8	50.1		9.4	17 33.3	28.8	
8.0	26.7	36.6	L	9.5	37.3	32.4		9.4	21.7	44.4		8.5	56.7	26.9	K	9.5	19 47.3	22.9	
8.8	27.0	43.3		9.5	33 31.4	55.4		9.0	43.3	30.6	K	9.1	41 5.4	18.1		9.0	20 18.2	44.2	
9.5	58 30.0	22.1		9.1	55.6	19.3	K	8.5	55.5	36.8	K	9.5	7.9	23.1		9.5	21 3.1	34.1	
9.5	38.7	49.8		9.4	34 23.7	44.3	B	9.5	10 46.4	16.4		9.2	42 13.6	12.2		9.4	22 5.2	37.1	
9.5	59 41.9	2.6		9.4	38.8	16.3	B	9.5	11 57.0	48.9		9.1	23.9	7.8		8.2	23 17.0	37.1	K
9.5	0 22.2	23.5		7.5	36 36.1	8.3	K	9.5	12 7.8	13.3		8.8	43 8.0	35.2	K	9.0	24 0.1	54.6	K
9.5	36.7	48.8		9.1	38 22.1	34.7		9.1	13 30.3	36.4		9.4	41.2	25.0	B	9.5	42.3	43.2	

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	12ʰ—13ʰ	+41°			13ʰ	+41°			13ʰ—14ʰ	+41°			14ʰ	+41°			14ʰ—15ʰ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	25 3.0	34.1	B	9.2	3 51.5	18.1	K	9.1	38 2.1	31.5		9.2	10 49.4	23.1		9.0	51 44.6	0.4	
7.9	26 23.9	33.0	K	9.3	4 16.7	55.8		8.0	39 1.8	8.4	G	9.4	52.5	36.0		8.8	52 39.7	23.2	
9.2	24.8	12.2	B	9.5	48.9	39.3		7.8	52.8	46.5	K	8.9	52.9	45.0	B	8.2	52.2	39.2	L
8.9	37.9	45.6	K	6.7	56.0	34.8	K	5.7	40 6.2	48.9	K	9.3	58.9	2.0	K	9.1	58.3	27.5	
8.8	27 33.0	21.9		9.5	5 59.7	42.7		9.3	30.8	0.4		8.5	11 30.8	2.2	K	9.4	55 29.1	51.9	
9.5	36.0	49.7		8.0	6 12.9	16.9	K	8.5	44.9	40.9	K	9.5	49.1	20.7		9.3	56 24.3	45.6	B
9.4	28 57.1	53.8	B	8.4	46.1	20.3	K	9.4	41 34.3	19.6		9.1	57.3	41.3		9.1	26.9	37.4	
7.5	29 13.6	22.8	K	9.4	7 50.2	51.6	B	9.5	47.7	36.2		9.5	12 7.2	18.2		8.8	29.2	10.2	
8.3	42.5	52.6	K	9.5	8 0.0	32.1		9.3	42 46.9	38.5	K	9.0	13 57.3	26.4		9.4	57 19.3	10.5	
9.1	30 45.5	58.6	K	9.4	19.8	32.6	B	9.5	43 25.3	26.4		9.1	14 57.2	22.5		9.3	36.1	54.2	B
8.6	31 37.3	48.4	B	9.4	20.2	40.6		8.6	57.6	44.9	K	9.4	15 27.2	57.8		9.4	58.1	55.4	
7.0	49.2	40.3	K	9.3	32.2	9.9	B	9.3	46 24.3	13.9	B	8.6	43.1	49.4	K	8.5	58 15.2	58.0	K
8.0	32 9.9	48.2	K	9.5	57.9	11.4		8.6	39.8	1.7	K	9.5	16 13.9	40.3	B	9.5	15.3	26.4	
9.5	28.2	22.3		6.0	9 3.0	37.5	K	6.7	59.8	3.7	K	8.9	17 50.0	6.8		9.4	26.8	15.9	
9.4	39.8	15.8		9.4	4.0	24.1	B	8.2	47 6.8	26.1	K	6.6	55.1	30.2	B	9.4	54.1	30.0	
9.5	56.4	47.5		9.0	31.2	2.4	B	8.9	31.8	9.6	K	7.5	18 19.9	42.0	B	9.4	59 6.2	51.6	
7.2	33 39.4	5.9	K	9.5	32.3	50.7		8.7	48 14.6	28.8	K	9.5	58.2	21.8		9.0	28.1	12.3	K
7.3	52.3	20.1	K	9.0	40.8	4.1		8.8	17.9	54.9		8.2	19 5.3	56.4	B	7.3	37.6	40.2	K
8.8	34 2.6	32.7		9.5	10 55.5	33.0		9.2	43.9	35.9	K	9.3	23.7	5.8		9.5	0 17.3	15.9	
7.2	30.8	23.2	K	4.3	11 4.0	20.4	K	9.0	49 38.7	16.6	L	9.4	20 29.6	21.3	B	9.2	1 5.5	58.6	
9.5	44.5	2.5		8.0	32.6	18.6	K	8.9	44.8	12.1	K	9.5	37.8	27.5		9.4	31.2	39.6	
8.5	36 4.0	58.0	K	9.3	12 54.1	59.0		9.4	50 2.0	22.2		9.5	51.6	59.3		9.3	52.0	55.2	
9.3	9.8	2.5	B	9.5	14 5.4	56.0		9.5	39.6	1.0	B	9.2	21 22.5	42.4	K	8.4	57.1	32.1	B
9.4	22.3	3.7		9.2	28.8	39.2	K	9.1	51 2.8	19.1	K	6.5	43.9	40.1	K	8.3	2 9.8	22.0	K
9.4	42.2	2.4		9.5	53.5	9.8		8.2	52 20.2	33.7	K	9.5	22 32.6	58.1	B	9.4	35.6	31.1	
9.5	37 9.8	11.8		9.2	15 28.8	5.8		9.4	39.8	36.0		9.1	32.6	44.9		9.5	4 43.3	37.3	
9.4	11.6	37.3		9.3	16 33.3	43.7	B	8.7	53 4.9	31.9	K	9.5	24 42.1	47.4		9.4	48.4	18.5	B
9.0	38 42.4	36.4	B	9.3	40.7	48.2		9.5	54 16.6	56.3		8.4	25 48.0	1.0		9.2	5 7.4	40.7	B
9.5	39 32.2	41.9	B	9.1	42.0	15.2	K	8.0	22.8	31.7	L	9.5	26 17.2	15.2		8.9	6 9.0	35.0	B
9.5	32.7	2.6		9.3	17 0.3	41.7		8.0	33.3	14.6	L	8.3	27 14.9	28.2	K	9.4	13.7	40.0	
9.5	41 35.1	13.1	B	9.3	34.9	27.4	K	9.1	55 5.3	4.7	K	8.3	40.7	12.2		9.0	15.6	35.5	
9.5	43 43.8	4.7		8.5	18 45.8	12.2	K	8.0	19.7	59.6	B	8.9	28 21.6	51.4		8.7	20.2	16.4	K
8.5	44 5.4	54.3		8.5	52.5	13.2	K	9.5	46.0	23.0		8.4	29 34.9	56.9	K	9.3	7 15.4	38.4	
9.5	6.4	2.5		9.0	19 1.7	24.1	L	6.5	47.1	9.6	K	9.3	30 11.6	41.4		9.5	16.0	35.4	
8.4	22.2	34.5	K	9.1	36.0	19.7	K	9.5	56 24.4	11.4	B	9.3	52.1	32.8		8.8	40.1	45.4	B
9.5	48.5	12.7		9.0	47.0	25.6	K	9.4	53.1	37.5		9.2	32 56.2	24.5		9.4	53.2	58.5	
8.0	45 7.0	2.1	L	9.3	49.3	4.3	K	9.1	57 0.6	49.4		9.5	34 22.9	39.4		9.5	8 25.3	16.8	
9.5	46 8.0	3.9		9.1	21 5.8	23.6	K	9.0	42.3	37.5	K	9.5	46.8	20.2		8.9	46.3	53.5	
8.0	50.3	42.2	K	8.9	34.7	52.0	B	9.5	58 21.2	2.2		8.0	35 36.0	11.2	G	9.2	50.4	43.6	
9.5	47 43.2	54.2		6.2	22 4.1	29.2	K	8.8	59 12.8	22.9	K	8.6	36 26.6	51.4	G	9.1	9 32.5	35.6	
9.5	48 52.7	43.2		9.5	30.0	27.2		8.5	47.7	1.3	K	8.7	53.6	45.4	G	9.4	10 20.0	31.1	
9.5	49 55.5	0.7		9.2	23 26.3	19.2	K	9.5	55.9	41.4		9.4	37 52.5	37.0		9.0	23.4	13.0	K
9.3	51 19.3	53.2	K	9.4	30.8	37.4		8.7	0 26.4	21.4		5.5	38 7.5	3.3	K	9.1	35.7	41.2	K
9.3	52 26.4	12.2		9.4	56.6	42.5		9.2	31.3	33.3	B	9.1	14.4	34.3	B	9.4	11 25.9	32.1	
7.5	59.4	15.5	B	9.4	24 16.5	8.8	B	9.5	50.3	37.3		9.4	41.5	34.7		9.2	28.8	42.1	K
9.3	53 35.5	22.6		9.4	32.2	1.6	B	8.6	1 7.2	27.4	L	9.0	39 20.6	5.2	K	9.0	36.3	56.5	B
9.5	54 19.5	59.2	B	9.5	25 1.3	0.4		8.7	47.7	17.3	K	9.2	40 32.2	45.5	B	9.3	43.3	32.6	B
8.1	57.3	35.5	K	9.5	26 15.2	37.1		8.9	58.3	17.6	K	9.3	43 33.7	32.8		8.2	47.8	49.3	K
9.5	55 19.6	24.5		9.5	27 42.3	1.8		9.5	2 21.4	56.9		9.3	44 1.1	58.3	K	9.4	52.4	37.6	
9.4	57.7	40.5		8.3	56.1	27.5	L	9.4	3 28.8	7.7		9.1	28.7	7.3	K	9.5	12 33.0	22.4	
9.5	56 12.3	27.4		9.5	28 27.9	40.1		7.0	4 4.5	28.4	K	9.2	45 8.8	37.1		9.2	14 26.9	5.7	
9.5	57 7.2	41.8		9.5	29 34.6	42.6		9.3	28.3	13.6		8.8	54.2	17.7	K	7.0	47.3	30.1	K
9.4	15.0	24.8	B	9.3	30 58.2	45.0	K	8.6	46.4	48.9	K	9.5	47 37.6	40.5		9.3	49.0	4.2	B
9.5	40.5	34.5		9.3	31 12.8	34.7		8.5	53.3	2.2	K	9.0	39.2	25.5	K	8.4	15 12.5	39.6	B
7.0	59 37.2	42.2	K	8.7	41.4	58.0	K	9.3	5 29.9	51.7	K	7.3	45.1	24.8	K	8.5	15.8	0.5	K
9.0	0 9.0	9.6		9.5	32 15.9	16.2		7.5	7 56.1	51.4	K	8.7	49 42.4	21.2	K	8.0	31.0	45.4	K
9.2	28.3	23.0		9.5	34 0.4	29.2		8.2	10 34.3	3.2	K	9.3	56.4	31.2	B	9.5	16 6.0	22.5	
9.2	41.9	3.7		9.0	36 48.1	21.7	L	9.4	35.9	35.3		9.2	50 15.5	51.6	B	9.3	18 18.7	32.8	
8.8	2 45.4	22.9	K	9.3	37 2.3	6.3		9.4	40.3	45.3		6.8	31.6	43.4	K	9.5	19 16.5	58.8	
9.5	3 39.3	59.8		8.1	50.2	58.5	K	9.0	43.8	21.2		9.4	34.6	54.9		8.5	21 16.3	6.0	K

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	15ʰ	+41°			15ʰ—16ʰ	+41°			16ʰ	+41°			16ʰ—17ʰ	+41°			17ʰ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	21 50.8	59.3		9.5	58 58.3	49.7		9.2	29 33.1	24.5	B	9.5	56 33.5	38.1		9.2	24 56.8	15.6	
9.0	22 36.9	10.4	K	8.8	59 13.1	9.5	K	9.3	41.4	31.3	K	9.0	39.6	43.4		9.4	58.5	30.9	B
9.4	38.5	18.4		9.1	30.3	26.2		9.5	30 46.2	50.9		8.9	57 38.6	31.9	K	8.8	25 4.8	4.3	L
8.5	23 15.3	52.8	K	9.1	30.4	33.5		9.0	59.8	4.2	K	7.9	50.4	23.7	K	8.4	12.5	19.4	L
9.5	22.7	36.0		8.5	50.7	9.5	K	8.2	31 1.8	11.7	K	7.5	58 32.2	10.5	K	8.8	26 40.8	37.1	K
9.2	39.8	59.8		9.5	0 10.7	46.8		8.5	53.3	40.4		9.5	59 47.6	36.5		9.5	27 8.3	3.5	
9.5	24 20.2	10.9		9.5	15.5	57.2		9.3	32 16.1	52.9		9.4	0 52.1	52.4		9.4	18.3	51.4	
9.3	57.3	22.2		9.0	2 29.1	19.5		9.1	16.3	56.8		9.5	52.6	44.4		8.8	27.8	14.6	
4.5	25 43.3	20.5	K	9.5	45.8	48.2		9.3	17.2	22.1		9.1	1 12.3	1.6	K	9.4	28 7.0	15.9	
9.5	26 15.5	10.3		6.8	3 3.7	1.5	K	9.0	57.3	12.1	K	8.5	14.2	19.5	K	5.5	31.8	21.5	K
4.8	36.6	24.6	K	9.0	53.6	3.6	K	9.3	33 21.6	12.1	K	9.5	49.0	27.7	B	9.2	44.5	13.9	B
9.1	27 26.3	20.4	K	9.5	4 20.0	3.6		9.5	37.1	56.4	B	9.0	2 1.9	27.9	K	9.4	44.8	54.3	
8.9	28 51.1	0.7		6.5	26.2	29.2	K	9.2	37.8	36.6		9.5	44.0	28.9		9.5	29 28.3	28.9	
9.0	30 29.5	40.4	K	9.1	41.8	26.0	K	9.5	41.5	13.1		9.5	55.2	19.8	B	9.4	33.3	57.4	
9.0	33 17.4	40.6		9.5	5 32.1	1.6		9.5	34 0.7	6.6		9.0	3 11.2	43.4		8.4	30 0.3	32.0	
9.5	34 12.3	42.5		9.0	47.6	21.0		9.5	35 48.7	21.5		9.0	50.1	45.9	K	6.7	4.3	0.6	K
9.5	14.4	5.8		9.3	6 9.5	49.2		9.1	51.0	58.1	B	9.1	4 51.6	14.7	B	8.8	8.4	9.7	K
9.5	33.8	17.5		9.2	56.1	58.8	B	9.4	36 27.4	24.4		9.2	5 13.3	25.0		9.5	24.3	42.3	
9.5	37.9	42.8		9.5	7 18.5	37.8		9.4	42.7	11.0		9.1	36.6	47.4		9.2	36.8	41.5	
9.5	35 1.8	8.4		7.5	48.6	10.5	K	7.9	48.0	36.6		9.3	36.6	49.4		9.4	48.8	33.7	
9.3	43.2	41.8		9.3	8 29.1	16.0	K	9.5	37 5.6	40.9		9.5	6 11.1	34.5		8.6	31 35.2	22.5	
8.2	47.4	24.5	L	9.1	9 13.4	6.2	B	7.5	24.3	27.6	K	8.3	24.5	55.3	K	9.5	57.0	55.2	
8.3	55.1	12.5	K	9.0	19.8	20.3	K	9.5	38 14.9	8.5		8.5	26.2	13.6	K	9.3	32 31.7	50.6	B
9.3	36 27.6	7.6		8.9	10 36.9	41.8	K	8.0	39 13.0	1.8	K	6.8	7 14.1	55.8	K	9.1	35.8	36.4	
9.4	35.0	21.3		9.5	11 13.6	8.6		8.5	21.6	56.9	K	9.3	26.5	22.0		9.5	40.6	49.4	
8.5	48.6	10.6	K	9.2	12 39.1	42.5	K	9.1	40 30.9	37.9		8.7	8 9.6	57.8	K	8.5	45.3	36.2	K
9.5	37 16.5	32.8		8.2	44.8	47.8	K	9.1	41 33.8	26.6		9.3	9 3.5	10.0		9.0	33 4.8	28.2	
9.2	31.3	42.2	K	9.4	14 24.1	14.0		9.5	42 0.0	23.4		9.4	23.1	39.9		9.3	5.4	58.5	
8.5	38 4.1	10.4	K	7.5	24.4	59.7	K	9.2	17.6	51.0		9.2	46.4	30.3	K	7.0	15.8	5.7	B
9.1	39 19.5	23.9	K	9.3	49.6	11.4		9.1	36.3	53.4		9.1	10 23.9	58.8		9.0	25.3	48.6	
9.1	26.8	21.4	K	9.2	15 14.2	9.4	B	9.5	41.7	37.7		8.9	34.6	52.3		9.3	44.4	27.8	
9.4	53.7	36.7		9.5	30.9	59.2		9.3	45.1	39.2	B	7.0	11 13.4	49.8	L	9.4	52.8	53.8	
8.0	40 5.4	39.1	L	8.2	45.3	23.3	K	9.5	43 46.0	12.5		8.9	20.5	41.3	B	8.9	34 36.2	14.0	B
9.1	11.1	18.4	K	9.5	16 2.0	28.0		7.0	44 21.2	54.4	K	9.0	24.2	39.8	K	7.7	37.1	7.1	K
9.0	41 9.8	34.7	K	8.6	3.3	18.0	K	9.5	27.6	30.0		9.4	12 39.6	59.8		9.1	51.6	3.9	
8.3	29.0	46.3	K	8.2	12.0	19.5	K	8.9	45 25.5	17.5		9.5	13 37.5	10.5		9.4	57.6	13.2	
9.5	43 15.8	49.7		7.3	35.1	47.3	L	9.5	29.3	27.5		8.5	14 2.1	40.4	L	9.3	59.2	22.0	R
9.4	26.1	3.6		9.5	17 54.6	36.0		9.0	47 9.7	18.5	K	9.3	6.6	37.2		9.1	35 4.7	28.0	
9.4	32.2	41.2		9.5	18 30.1	12.0		9.5	12.6	46.9		8.4	15 45.4	36.5	K	9.4	11.8	55.6	
9.2	45 0.9	40.8		9.5	19 1.8	23.6		9.4	12.6	36.9		8.0	16 21.2	30.9	K	8.7	15.3	23.5	B
8.5	46 6.5	4.1	L	9.2	7.0	34.9		8.9	14.5	10.4	K	9.2	38.5	11.6		8.5	33.8	35.8	K
7.5	48 3.5	43.9	B	9.3	41.5	37.8		8.9	16.2	31.9	K	9.0	17 0.3	2.1		6.5	36 39.8	43.8	K
7.5	23.8	10.5	K	8.3	20 4.9	51.2		9.5	31.6	6.3		8.6	3.5	33.9	K	9.0	49.9	31.0	
9.5	35.4	46.3		9.4	18.6	27.4		9.3	33.6	3.8	B	8.8	20.6	47.3	K	8.5	37 13.9	50.9	K
9.5	49 7.2	34.1	B	9.4	59.0	32.9		9.4	44.0	19.4		8.8	18 17.5	21.4		9.3	13.9	48.3	B
9.5	30.2	24.6		9.3	21 26.0	25.7		9.5	48 40.6	36.4		9.2	19 46.1	39.3		9.5	15.3	42.7	
9.5	50 23.5	46.8		6.5	30.5	9.0	K	8.5	57.5	50.9	K	9.4	58.0	59.6		7.5	20.4	5.5	L
9.5	51 30.4	38.0	B	8.7	53.4	14.0	K	9.2	50 54.0	5.1	K	9.3	20 53.3	29.1		9.5	55.5	33.0	
8.5	53.5	59.7	L	8.2	22 28.0	33.5	L	9.5	51 42.5	21.0		8.3	21 4.9	52.6		9.5	38 51.5	49.3	
9.3	53 13.4	45.8		8.0	23 20.6	47.3	K	9.2	47.0	9.6	K	9.5	22 22.9	29.4	B	7.5	39 3.5	41.3	K
9.4	54 5.3	28.7		9.4	37.4	55.5		9.5	52 8.6	42.9		9.5	39.3	22.2		8.8	46.7	58.7	B
9.0	43.7	10.5		9.5	55.2	37.0		9.4	53 9.7	9.0		9.2	23 6.8	43.1		9.4	40 1.1	10.4	
9.5	51.2	28.9		9.5	24 55.6	52.8		9.2	13.4	51.9	B	8.3	14.4	3.1	L	9.5	18.4	3.8	
9.5	54.1	6.0		8.9	25 20.3	43.4		9.3	13.8	53.2		9.4	39.7	10.9	B	9.4	19.9	47.1	B
8.5	58.0	17.9	L	7.5	32.3	2.7	K	9.2	41.6	56.9		9.5	47.8	43.2		9.5	21.8	23.3	
9.4	55 11.4	10.4		9.1	26 9.1	48.4		9.5	54 24.3	58.9		9.5	52.9	57.0		9.3	41 7.8	35.8	
8.9	56 22.5	49.2		9.1	24.5	21.2	K	9.5	25.5	17.6		9.4	58.6	10.9	B	8.4	54.6	53.8	K
8.7	57 16.8	58.2	L	9.5	25.2	25.6		8.4	55 32.6	38.9	K	9.4	24 5.3	36.1		8.8	42 22.3	55.0	K
9.4	30.9	43.8		9.0	43.1	41.5		9.2	56 7.6	1.7	K	7.3	14.2	30.6	K	9.5	33.4	38.3	
9.5	58 44.2	48.3		9.5	29 8.8	32.9		9.2	18.7	34.1	B	9.5	20.8	32.0		9.5	40.7	48.0	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	17ᵘ	+41°			17ᵘ—18ᵘ	+41°			18ᵘ	+41°			18ᵘ	+41°			18ᵘ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	42 58.0	35.5		9.5	57 39.8	21.5		9.4	11 11.3	4.7		9.5	28 1.4	23.6		9.5	42 26.1	42.8	
9.5	58.9	9.6		8.5	52.8	40.7	K	9.3	32.5	27.1		8.8	42.0	56.8	K	9.2	27.7	14.1	K
9.5	43 5.1	44.0	B	9.5	58 15.4	9.1	B	9.5	12 17.0	1.8		8.4	42.1	58.0	K	7.7	46.5	52.9	K
8.1	7.0	6.6	B	9.5	39.8	19.8		9.5	58.4	49.6		9.3	43.3	53.6		9.3	43 9.0	50.0	K
9.4	34.8	41.3		7.5	59 16.3	20.8	K	9.5	13 29.3	23.3		8.8	29 16.7	0.0	K	9.0	14.2	36.1	
9.2	44 28.7	24.5	B	9.2	37.9	28.4		9.2	50.0	55.6	K	9.0	17.7	5.7	K	9.3	19.6	13.1	
9.0	53.8	13.3	K	9.4	0 15.0	14.9		9.5	14 2.0	44.3		9.5	18.0	35.4		9.1	24.9	12.3	B
9.5	45 25.3	20.5		6.3	29.5	55.9	K	8.2	15 17.9	56.0	K	8.9	21.8	16.7		9.2	44 7.1	55.5	
8.5	51.7	13.5	K	9.1	36.3	40.0		8.5	37.7	55.2	K	8.4	24.3	14.3	L	9.2	9.6	58.0	
9.5	46 24.2	7.2		8.7	1 3.9	3.1		9.2	16 22.8	16.0	K	9.4	47.7	1.9		8.9	14.7	16.1	
8.7	38.8	47.6	K	9.0	16.0	52.0		9.4	36.4	6.9		9.5	48.1	41.4		9.5	26.1	29.2	
9.3	47 1.0	43.8		9.3	17.2	57.1		9.3	43.3	21.2	K	8.0	30 4.3	27.8	L	9.5	40.2	3.5	
9.1	9.3	41.0		8.9	20.3	53.7	B	9.3	17 4.8	27.8		9.4	4.9	51.3		9.3	43.7	2.4	
9.4	13.7	1.5		9.5	26.0	37.0		9.4	5.9	32.6		9.4	28.8	4.8		9.5	50.8	54.1	
9.5	31.8	30.2		8.3	30.0	23.3	L	7.3	15.8	8.6	K	9.5	31.0	45.8		9.5	52.6	8.1	
8.8	48 11.3	50.9	B	8.8	30.9	39.0	B	9.4	18.9	49.7		6.8	39.6	27.1	L	9.4	54.6	36.8	
9.3	49 8.2	15.4		9.4	35.2	8.9		9.3	31.0	54.5		9.5	46.8	28.8		9.5	57.9	49.3	
9.5	15.2	6.6	B	9.4	38.1	17.0		9.2	18 8.8	29.4		9.4	53.9	58.7		9.5	45 0.7	11.4	
9.2	37.0	25.8	K	9.5	47.4	5.8	B	9.2	23.7	33.7	K	9.5	31 15.5	40.3		9.0	23.4	0.3	K
9.2	41.4	29.1		9.5	49.8	28.1		9.1	55.9	34.2	K	6.8	35.0	9.6	S	8.5	57.1	20.6	G
9.5	46.1	59.9		9.5	58.3	46.9		9.1	19 6.0	54.7		9.0	32 19.3	42.9		9.0	46 14.6	22.0	
9.2	50 8.8	54.7		9.5	2 2.5	59.7		8.9	20.0	32.0	K	9.4	39.3	45.9		9.2	41.5	36.5	B
9.0	23.0	59.6		9.1	33.3	27.8	K	9.4	29.3	26.3		9.1	53.8	44.4	K	9.5	57.1	59.3	
8.4	34.1	29.9	K	8.3	38.3	32.4	K	9.5	33.9	58.0		9.1	58.4	34.0	K	8.0	47 9.6	18.2	G
9.2	36.9	28.5	K	9.0	54.8	20.8	K	9.5	20 8.1	3.1		9.5	59.0	52.0		7.3	13.4	33.4	L
9.0	44.8	43.7		9.5	3 4.9	39.0		9.1	11.3	13.5		9.5	33 22.5	6.7		9.5	23.6	54.5	
9.5	45.5	46.5		9.3	10.3	15.0	K	9.0	28.2	5.1	K	9.5	27.2	59.7		6.5	28.2	12.6	K
8.8	55.7	8.7		7.0	18.8	41.7	K	9.4	39.8	7.9		9.0	42.5	16.4		8.0	47.1	58.4	B
8.8	51 13.4	50.8		9.5	29.6	23.0		9.5	47.8	5.9		9.5	34 15.5	58.2		9.5	48 2.0	42.7	
9.3	29.8	6.5		9.5	4 37.4	37.8		9.1	51.4	18.8		9.5	27.0	54.7		9.4	2.8	2.7	
8.9	33.1	17.3		9.5	40.9	50.3		8.7	54.7	13.9	K	9.5	43.0	57.2		9.5	25.9	38.6	
9.5	33.1	42.0		9.4	49.6	55.3		9.5	21 15.0	51.6		9.4	50.2	19.3		9.5	47.8	49.2	
9.1	38.2	59.6		9.3	5 5.4	50.1		9.5	47.9	18.4		9.4	35 5.4	29.2		8.5	49 15.3	59.4	K
8.5	52 16.8	15.3	S	9.1	29.5	50.0		9.5	49.3	15.6		9.5	23.6	39.8	B	7.1	32.2	3.2	K
9.1	33.3	32.9		9.4	34.8	18.0		9.4	22 10.4	44.5		9.0	47.6	25.1		9.5	50 2.6	6.1	
9.5	40.9	53.5		9.2	39.0	55.4		8.7	28.3	23.6	K	7.0	36 24.3	47.9	L	9.5	7.3	42.0	
8.6	44.7	3.1	K	9.2	6 2.7	59.4		9.2	42.5	40.5	K	7.8	54.6	15.5	L	5.5	13.1	25.4	K
9.0	55.1	10.0		9.1	37.3	32.6	K	9.4	23 15.8	21.5		9.0	37 3.1	34.7		9.2	31.5	7.0	K
9.0	53 3.1	13.2	K	9.5	39.4	20.5		8.8	52.8	23.8		9.4	7.1	20.0		9.1	40.2	3.3	K
9.5	3.4	45.8		9.4	53.5	10.4		9.5	57.0	51.9		9.0	8.4	47.4		9.5	45.0	51.4	
9.3	15.7	56.4		9.5	58.5	43.5		9.5	24 1.4	58.5		8.9	55.6	34.1	K	9.3	47.1	52.4	B
9.3	26.0	9.8		9.5	7 3.4	55.6		9.1	37.0	29.9		9.4	38 12.0	59.9		7.0	59.6	52.3	K
9.5	32.8	21.5		9.5	7.9	53.0		9.0	51.7	52.4		9.4	14.6	20.2		9.4	51 2.6	56.9	B
9.4	38.8	47.6		8.8	11.6	30.5	K	8.4	53.0	21.2	L	9.5	48.6	1.1		9.4	4.1	52.4	
9.4	48.6	27.8		9.5	14.3	47.5		9.5	55.1	56.9		9.5	39 13.6	1.1		9.4	7.5	4.5	B
9.5	54 34.3	15.6		8.3	16.4	1.1	L	9.5	55.2	2.7		9.2	26.7	9.7	K	9.0	14.9	19.9	R
9.5	39.4	30.9		9.5	53.3	48.9		9.5	25 34.3	13.6	B	8.9	40.0	1.1	K	9.5	17.2	48.9	
7.6	55 0.0	45.2	L	9.5	53.8	39.9		9.0	37.1	0.3	K	9.3	48.6	43.0		9.4	32.5	1.6	
9.5	0.4	11.1		9.2	56.0	59.8	K	9.5	49.5	44.4		9.4	55.9	29.5	B	8.8	35.3	15.8	
9.5	3.8	58.4		7.8	8 3.8	20.9	S	9.5	52.7	46.8		9.5	57.9	26.0		9.5	52 8.1	33.8	
9.1	37.0	49.6		5.8	7.9	7.3	G	8.9	54.7	49.5		9.5	40 8.2	42.0		9.3	16.4	4.9	
8.1	53.7	2.9	K	9.5	27.1	33.0		9.5	26 4.8	57.4		9.2	23.8	21.0	K	9.5	18.4	25.5	
9.1	56 9.3	49.1		7.0	32.5	27.8	L	9.4	8.4	53.5		9.3	47.7	4.7		9.4	30.1	44.7	
9.3	14.3	45.2		9.5	9 9.3	19.4		8.5	12.3	31.0	K	8.5	53.0	51.5		9.5	31.8	3.0	
7.8	14.4	28.5	L	9.5	36.2	24.7		6.9	20.9	0.3	K	8.5	41 3.3	14.4	K	9.0	43.0	55.[illegible]	
9.5	32.8	50.7		9.4	10 17.5	55.6		8.5	23.6	47.8	B	9.5	33.7	9.3		7.3	49.6	54.[illegible]	
9.1	47.1	2.6	K	9.5	25.0	19.0		9.1	36.8	53.6		6.0	34.2	17.1	K	9.4	53 22.[illegible]	[illegible]	
9.3	50.2	48.9	K	9.5	27.1	2.2		9.5	27 16.6	12.9		9.4	37.2	8.0		8.5	54 1[illegible]		
9.5	57 10.4	41.0		9.5	39.5	19.1		9.5	20.5	51.6		8.5	43.1	51.4		9.5			
9.5	16.6	22.6		9.4	49.7	54.3		9.5	49.3	4.6		7.8	45.6	32.0	L	8.0			

2601—2660			
	15h	+41°	
m	′ ″	′	
9.5	21 50.8	59.3	
9.0	22 36.9	10.4	K
9.4	38.5	18.4	
8.5	23 15.3	52.8	K
9.5	22.7	36.0	
9.2	39.8	59.8	
9.5	24 20.2	10.9	
9.3	57.3	22.2	
4.5	25 43.3	20.5	K
9.5	26 15.5	10.3	
4.8	36.6	24.6	K
9.1	27 26.3	20.4	K
8.9	28 51.1	0.7	
9.0	30 29.5	40.4	K
9.0	33 17.4	40.6	
9.5	34 12.3	42.5	
9.5	14.4	5.8	
9.5	33.8	17.5	
9.5	37.9	42.8	
9.5	35 1.8	8.4	
9.3	43.2	41.8	
8.2	47.4	24.5	L
8.3	55.1	12.5	K
9.3	36 27.6	7.6	
9.4	35.0	21.3	
8.5	48.6	10.6	K
9.5	37 16.5	32.8	
9.2	31.3	42.2	K
8.5	38 4.1	10.4	K
9.1	39 19.5	23.9	K
9.1	26.8	21.4	K
9.4	53.7	36.7	
8.0	40 5.4	39.1	L
9.1	11.1	18.4	K
9.0	41 9.8	34.7	K
8.3	29.0	46.3	K
9.5	43 15.8	49.7	
9.4	26.1	3.6	
9.4	32.2	41.2	
9.2	45 0.9	40.8	
8.5	46 6.5	4.1	L
7.5	48 3.5	43.9	B
7.5	23.8	10.5	K
9.5	35.4	46.3	
9.5	49 7.2	34.1	B
9.5	30.2	24.6	
9.5	50 23.5	46.8	
9.5	51 30.4	38.0	B
8.5	53.5	59.7	L
9.3	53 13.4	45.8	
9.4	54 5.3	28.7	
9.0	43.7	10.5	
9.5	51.2	28.9	
9.5	54.1	6.0	
8.5	58.0	17.9	L
9.4	55 11.4	10.4	
8.9	56 22.5	49.2	
8.7	57 16.8	58.2	L
9.4	30.9	43.8	
9.5	58 44.2	48.3	

2661—2720			
	15h—16h	+41°	
m	′ ″	′	
9.5	58 58.3	49.7	
8.8	59 13.1	9.5	K
9.1	30.3	26.2	
9.1	30.4	33.5	
8.5	50.7	9.5	K
9.5	0 10.7	46.8	
9.5	15.5	57.2	
9.0	2 29.1	19.5	
9.5	45.8	48.2	
6.8	3 3.7	1.5	K
9.0	53.6	3.6	K
9.5	4 20.0	3.6	
6.5	26.2	29.2	K
9.1	41.8	26.0	K
9.5	5 32.1	1.6	
9.0	47.6	21.0	
9.3	6 9.5	49.7	
9.2	56.1	58.8	B
9.5	7 18.5	37.8	
7.5	48.6	10.5	K
9.3	8 29.1	16.0	K
9.1	9 13.4	6.2	B
9.0	19.8	20.3	K
8.9	10 36.9	41.8	K
9.5	11 13.6	8.6	
9.2	12 39.1	42.5	K
8.2	44.8	47.8	K
9.4	14 24.1	14.0	
7.5	24.4	59.7	K
9.3	49.6	11.4	
9.2	15 14.2	9.4	B
9.5	30.9	59.2	
8.2	45.3	23.3	K
9.5	16 2.0	28.0	
8.6	3.3	18.0	K
8.2	12.0	19.5	K
7.3	35.1	47.3	L
9.5	17 54.6	36.0	
9.5	18 30.1	12.0	
9.5	19 1.8	23.6	
9.2	7.0	34.9	
9.3	41.5	37.8	
8.3	20 4.9	51.2	
9.4	18.6	27.4	
9.4	59.0	32.9	
9.3	21 26.0	25.7	
6.5	30.5	9.0	K
8.7	53.4	14.0	K
8.2	22 28.0	33.5	L
8.0	23 20.6	47.3	K
9.4	37.4	55.5	
9.5	55.2	37.0	
9.5	24 55.6	52.8	
8.9	25 20.3	43.4	
7.5	32.3	2.7	K
9.1	26 9.1	48.4	
9.1	24.5	21.2	K
9.5	25.2	25.6	
9.0	43.1	41.5	
9.5	29 8.8	32.9	

2721—2780			
	16h	+41°	
m	′ ″	′	
9.2	29 33.1	24.5	B
9.3	41.4	31.3	K
9.5	30 46.2	50.9	
9.0	59.8	4.2	K
8.2	31 1.8	11.7	K
8.5	53.3	40.4	
9.3	32 16.1	52.9	
9.1	16.3	56.8	
9.3	17.2	22.1	
9.0	57.3	12.1	K
9.3	33 21.6	12.1	K
9.5	37.1	56.4	B
9.2	37.8	36.6	
9.5	41.5	13.1	
9.5	34 0.7	6.6	
9.5	35 48.7	21.5	
9.1	51.0	58.1	B
9.4	36 27.4	24.4	
9.4	42.7	11.0	
7.9	48.0	36.6	
9.5	37 5.6	40.9	
7.5	24.3	27.6	K
9.5	38 14.9	8.5	
8.0	39 13.0	1.8	K
8.5	21.6	56.9	K
9.1	40 30.9	37.9	
9.1	41 33.8	26.6	
9.5	42 0.0	23.4	
9.2	17.6	51.0	
9.1	36.3	53.4	
9.5	41.7	37.7	
9.3	45.1	39.2	B
9.5	43 46.0	12.5	
7.0	44 21.2	54.4	K
9.5	27.6	30.0	
8.9	45 25.5	17.5	
9.5	29.3	27.5	
9.0	47 9.7	18.5	K
9.5	12.6	46.9	
9.4	12.6	36.9	
8.9	14.5	10.4	K
8.9	16.2	31.9	K
9.5	31.6	6.3	
9.3	33.6	3.8	B
9.4	44.0	19.4	
9.5	48 40.6	36.4	
8.5	57.5	50.9	K
9.2	50 54.0	5.1	K
9.5	51 42.5	21.0	
9.2	47.0	9.6	K
9.5	52 8.6	42.9	
9.4	53 9.7	9.0	
9.2	13.4	51.9	B
9.3	13.8	53.2	
9.2	41.6	56.9	
9.5	54 24.3	58.9	
9.5	25.5	17.6	
8.4	55 32.6	38.9	K
9.2	56 7.6	1.7	K
9.2	18.7	34.1	B

2781—2840			
	16h—17h	+41°	
m	′ ″	′	
9.5	56 33.5	38.1	
9.0	39.6	43.4	
8.9	57 38.6	31.9	K
7.9	50.4	23.7	K
7.5	58 32.2	10.5	K
9.5	59 47.6	36.5	
9.4	0 52.1	52.4	
9.5	52.6	44.4	
9.1	1 12.3	1.6	K
8.5	14.2	19.5	K
9.5	49.0	27.7	B
9.0	2 1.9	27.9	K
9.5	44.0	28.9	
9.5	55.2	19.8	B
9.0	3 11.2	43.4	
9.0	50.1	45.9	K
9.1	4 51.6	14.7	B
9.2	5 13.3	25.0	
9.1	36.6	47.4	
9.3	36.6	49.4	
9.5	6 11.1	34.5	
8.3	24.5	55.3	K
8.5	26.2	13.6	K
6.8	7 14.1	55.8	K
9.3	26.5	22.0	
8.7	8 9.6	57.8	K
9.3	9 3.5	10.0	
9.4	23.1	39.9	
9.2	46.4	30.3	K
9.1	10 23.9	58.8	
8.9	34.6	52.3	
7.0	11 13.4	49.8	L
8.9	20.5	41.3	B
9.0	24.2	39.8	K
9.4	12 39.6	59.8	
9.5	13 37.5	10.5	
8.5	14 2.1	40.4	L
9.3	6.6	37.2	
8.4	15 45.4	36.5	K
8.0	16 21.2	30.9	K
9.2	38.5	11.6	
9.0	17 0.3	2.1	
8.6	3.5	33.9	K
8.8	20.6	47.3	K
8.8	18 17.5	21.4	
9.2	19 46.1	39.3	
9.4	58.0	59.6	
9.3	20 53.3	29.1	
8.3	21 4.9	52.6	
9.5	22 22.9	29.4	B
9.5	39.3	22.2	
9.2	23 6.8	43.1	
8.3	14.4	3.1	L
9.4	39.7	10.9	B
9.5	47.8	43.2	
9.5	52.9	57.0	
9.4	58.6	10.9	B
9.4	24 5.3	36.1	
7.3	14.2	30.6	K
9.5	20.8	32.0	

2841—2900			
	17h	+41°	
m	′ ″	′	
9.2	24 56.8	15.6	
9.4	58.5	30.9	B
8.8	25 4.8	4.3	L
8.4	12.5	19.4	L
8.8	26 40.8	37.1	K
9.5	27 8.3	3.5	
9.4	18.3	51.4	
8.8	27.8	14.6	
9.4	28 7.0	15.9	
5.5	31.8	21.5	K
9.2	44.5	13.9	B
9.4	44.8	54.3	
9.5	29 28.3	28.9	
9.4	33.3	57.4	
8.4	30 0.3	32.0	
6.7	4.3	0.6	K
8.8	8.4	9.7	K
9.5	24.3	42.3	
9.2	36.8	41.5	
9.4	48.8	33.7	
8.6	31 35.2	22.5	
9.5	57.0	55.2	
9.3	32 31.7	50.6	B
9.1	35.8	36.4	
9.5	40.6	49.4	
8.5	45.3	36.2	K
9.0	33 4.8	28.2	
9.3	5.4	58.5	
7.0	15.8	5.7	B
9.0	25.3	48.6	
9.3	44.4	27.8	
9.4	52.8	53.8	
8.9	34 36.2	14.0	B
7.7	37.1	7.1	K
9.1	51.6	3.9	
9.4	57.6	13.2	
9.3	59.2	22.0	B
9.1	35 4.7	28.0	
9.4	11.8	55.6	
8.7	15.3	23.5	B
8.5	33.8	35.8	K
6.5	36 39.8	43.8	K
9.0	49.9	31.0	
8.5	37 13.9	50.9	K
9.3	13.9	48.3	B
9.5	15.3	42.7	
7.5	20.4	5.5	L
9.5	55.5	33.0	
9.5	38 51.5	49.3	
7.5	39 3.5	41.3	K
8.8	46.7	58.7	B
9.4	40 1.1	10.4	
9.5	18.4	3.8	
9.4	19.9	47.1	B
9.5	21.8	23.3	
9.3	41 7.8	35.8	
8.4	54.6	53.8	K
8.8	42 22.3	55.0	K
9.5	33.4	38.3	
9.5	40.7	48.0	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	17ᵘ	+41°			17ᵘ—18ᵘ	+41°			18ᵘ	+41°			18ᵘ	+41°			18ᵘ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	42 58.0	35.5		9.5	57 39.8	21.5		9.4	11 11.3	4.7		9.5	28 1.4	23.6		9.5	42 26.1	42.8	
9.5	58.9	9.6		8.5	52.8	40.7	K	9.3	32.5	27.1		8.8	42.0	56.8	K	9.2	27.7	14.1	K
9.5	43 5.1	44.0	B	9.5	58 15.4	9.1	B	9.5	12 17.0	1.8		8.4	42.1	58.0	K	7.7	46.5	52.9	K
8.1	7.0	6.6	B	9.5	39.8	19.8		9.5	58.4	49.6		9.3	43.3	53.6		9.3	43 9.0	50.0	K
9.4	34.8	41.3		7.5	59 16.3	20.8	K	9.5	13 29.3	23.3		8.8	29 16.7	0.0	K	9.0	14.2	36.1	
9.2	44 28.7	24.5	B	9.2	37.9	28.4		9.2	50.0	55.6	K	9.0	17.7	5.7	K	9.3	19.6	13.1	
9.0	53.8	13.3	K	9.4	0 15.0	14.9		9.5	14 2.0	44.3		9.5	18.0	35.4		9.1	24.9	12.3	B
9.5	45 25.3	20.5		6.3	29.5	55.9	K	8.2	15 17.9	56.0	K	8.9	21.8	16.7		9.2	44 7.1	55.5	
8.5	51.7	13.5	K	9.1	36.3	40.0		8.5	37.7	55.2	K	8.4	24.3	14.3	L	9.2	9.6	58.0	
9.5	46 24.2	7.2		8.7	1 3.9	3.1		9.2	16 22.8	16.0	K	9.4	47.7	1.9		8.9	14.7	16.1	
8.7	38.8	47.6	K	9.0	16.0	52.0		9.4	36.4	6.9		9.5	48.1	41.4		9.5	26.1	29.2	
9.3	47 1.0	43.8		9.3	17.2	57.1		9.3	43.3	21.2	K	8.0	30 4.3	27.8	L	9.5	40.2	3.5	
9.1	9.3	41.0		8.9	20.3	53.7	B	9.3	17 4.8	27.8		9.4	4.9	51.3		9.3	43.7	2.4	
9.4	13.7	1.5		9.5	26.0	37.0		9.4	5.9	32.6		9.4	28.8	4.8		9.5	50.8	54.1	
9.5	31.8	30.2		8.3	30.0	23.3	L	7.3	15.8	8.6	K	9.5	31.0	45.8		9.5	52.6	8.1	
8.8	48 11.3	50.9	B	8.8	30.9	39.0	B	9.4	18.9	49.7		6.8	39.6	27.1	L	9.4	54.6	36.8	
9.3	49 8.2	15.4		9.4	35.2	8.9		9.3	31.0	54.5		9.5	46.8	28.8		9.5	57.9	49.3	
9.5	15.2	6.6	B	9.4	38.1	17.0		9.2	18 8.8	29.4		9.4	53.9	58.7		9.5	45 0.7	11.4	
9.2	37.0	25.8	K	9.5	47.4	5.8	B	9.2	23.7	33.7	K	9.5	31 15.5	40.3		9.0	23.4	0.3	K
9.2	41.4	29.1		9.5	49.8	28.1		9.1	55.9	34.2	K	6.8	35.0	9.6	S	8.5	57.1	20.6	G
9.5	46.1	59.9		9.5	58.3	46.9		9.1	19 6.0	54.7		9.0	32 19.3	42.9		9.0	46 14.6	22.0	
9.2	50 8.8	54.7		9.5	2 2.5	59.7		8.9	20.0	32.0	K	9.4	39.3	45.9		9.2	41.5	36.5	B
9.0	23.0	59.6		9.1	33.3	27.8	K	9.4	29.3	26.3		9.1	53.8	44.4	K	9.5	57.1	59.3	
8.4	34.1	29.9	K	8.3	38.3	32.4	K	9.5	33.9	58.0		9.1	58.4	34.0	K	8.0	47 9.6	18.2	G
9.2	36.9	28.5	K	9.0	54.8	20.8	K	9.5	20 8.1	3.1		9.5	59.0	52.0		7.3	13.4	33.4	L
9.0	44.8	43.7		9.5	3 4.9	39.0		9.1	11.3	13.5		9.5	33 22.5	6.7		9.5	23.6	54.5	
9.5	45.5	46.5		9.3	10.3	15.0	K	9.0	28.2	5.1	K	9.5	27.2	59.7		6.5	28.2	12.6	K
8.8	55.7	8.7		7.0	18.8	41.7	K	9.4	39.8	7.9		9.0	42.5	16.4		8.0	47.1	58.4	B
8.8	51 13.4	50.8		9.5	29.6	23.0		9.5	47.8	5.9		9.5	34 15.5	58.2		9.5	48 2.0	42.7	
9.3	29.8	6.5		9.5	4 37.4	37.8		9.1	51.4	18.8		9.5	27.0	54.7		9.4	2.8	2.7	
8.9	33.1	17.3		9.5	40.9	50.3		8.7	54.7	13.9	K	9.5	43.0	57.2		9.5	25.9	38.6	
9.5	33.1	42.0		9.4	49.6	55.3		9.5	21 15.0	51.6		9.4	50.2	19.3		9.5	47.8	49.2	
9.1	38.2	59.6		9.3	5 5.4	50.1		9.5	47.9	18.4		9.4	35 5.4	29.2		8.5	49 15.3	59.4	K
8.5	52 16.8	15.3	S	9.1	29.5	50.0		9.5	49.3	15.6		9.5	23.6	39.8	B	7.1	32.2	3.2	K
9.1	33.3	32.9		9.4	34.8	18.0		9.4	22 10.4	44.5		9.0	47.6	25.1		9.5	50 2.6	6.1	
9.5	40.9	53.5		9.2	39.0	55.4		8.7	28.3	23.6	K	7.0	36 24.3	47.9	L	9.5	7.3	42.0	
8.6	44.7	3.1	K	9.2	6 2.7	59.4		9.2	42.5	40.5	K	7.8	54.6	15.5	L	5.5	13.1	25.4	K
9.0	55.1	10.0		9.1	37.3	32.6	K	9.4	23 15.8	21.5		9.0	37 3.1	34.7		9.2	31.5	7.0	K
9.0	53 3.1	13.2	K	9.5	39.4	20.5		8.8	52.8	23.8		9.4	7.1	20.0		9.1	40.2	3.3	K
9.5	3.4	45.8		9.4	53.5	10.4		9.5	57.0	51.9		9.0	8.4	47.4		9.5	45.0	51.4	
9.3	15.7	56.4		9.5	58.5	43.5		9.5	24 1.4	58.5		8.9	55.6	34.1	K	9.3	47.1	52.4	B
9.3	26.0	9.8		9.5	7 3.4	55.6		9.1	37.0	29.9		9.4	38 12.0	59.9		7.0	59.6	52.3	K
9.5	32.8	21.5		9.5	7.9	53.0		9.0	51.7	52.4		9.4	14.6	20.2		9.4	51 2.6	56.9	B
9.4	38.8	47.6		8.8	11.6	30.5	K	8.4	53.0	21.2	L	9.5	48.6	1.1		9.4	4.1	52.4	
9.4	48.6	27.8		9.5	14.3	47.5		9.5	55.1	56.9		9.5	39 13.6	1.1		9.4	7.5	4.5	B
9.5	54 34.3	15.6		8.3	16.4	1.1	L	9.5	55.2	2.7		9.2	26.7	9.7	K	9.0	14.9	19.9	R
9.5	39.4	30.9		9.5	53.3	48.9		9.5	25 34.3	13.6	B	8.9	40.0	1.1	K	9.5	17.2	48.9	
7.6	55 0.0	45.2	L	9.5	53.8	39.9		9.0	37.1	0.3	K	9.3	48.6	43.0		9.4	32.5	1.6	
9.5	0.4	11.1		9.2	56.0	59.8	K	9.5	49.5	44.4		9.4	55.9	29.5	B	8.8	35.3	15.8	
9.5	3.8	58.4		7.8	8 3.8	20.9	S	9.5	52.7	46.8		9.5	57.9	26.0		9.5	52 8.1	33.8	
9.1	37.0	49.6		5.8	7.9	7.3	G	8.9	54.7	49.5		9.5	40 8.2	42.0		9.3	16.4	4.9	
8.1	53.7	2.9	K	9.5	27.1	33.0		9.5	26 4.8	57.4		9.2	23.8	21.0	K	9.5	18.4	25.5	
9.1	56 9.3	49.1		7.0	32.5	27.8	L	9.4	8.4	53.5		9.3	47.7	4.7		9.4	30.1	44.7	
9.3	14.3	45.2		9.5	9 9.3	19.4		8.5	12.3	31.0	K	8.5	53.0	51.5		9.5	31.8	3.0	
7.8	14.4	28.5	L	9.5	36.2	24.7		6.9	20.9	0.3	K	8.5	41 3.3	14.4	K	9.0	43.0	55.5	
9.5	32.8	50.7		9.4	10 17.5	55.6		8.5	23.6	47.8	B	9.5	33.7	9.3		7.3	49.6	54.6	G
9.1	47.1	2.6	K	9.5	25.0	19.0		9.1	36.8	53.6		6.0	34.2	17.1	K	9.4	53 22.6	51.3	
9.3	50.2	48.9	K	9.5	27.1	2.2		9.5	27 16.6	12.9		9.4	37.2	8.0		8.5	54 17.8	3.7	K
9.5	57 10.4	41.0		9.5	39.5	19.1		9.5	20.5	51.6		8.5	43.1	51.4		9.5	26.6	14.4	
9.5	16.6	22.6		9.4	49.7	54.3		9.5	49.3	4.6		7.8	45.6	32.0	L	8.0	42.1	26.2	K

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	18h—19h	+41°			19h	+41°			19h	+41°			19h	+41°			19h	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	54 48.5	51.3		8.8	7 9.7	8.3	K	9.5	16 40.7	27.4		9.1	27 30.9	44.2	K	8.3	35 4.7	17.1	K
9.2	55 25.4	11.4	K	9.0	9.8	59.3	K	9.5	46.3	58.1		9.5	35.2	42.5		8.2	12.8	52.8	K
9.0	29.6	36.5	K	8.7	13.2	52.0	K	9.5	58.5	49.3		9.3	38.0	27.6	K	9.5	22.7	8.6	
9.3	41.1	8.9		7.8	27.5	37.4	L	9.5	17 2.6	10.0		8.9	42.2	57.9	K	9.0	39.5	18.3	K
9.5	44.2	49.3		9.5	58.0	36.6		9.5	26.9	26.8		9.5	42.6	21.5		9.1	47.6	7.9	
7.5	52.4	29.0	K	9.4	8 14.2	8.2		9.5	32.3	8.4		9.5	58.0	12.4		9.2	56.9	16.1	
9.2	56 15.3	49.2	K	9.5	17.1	46.7		8.8	42.5	48.4		9.4	28 3.6	24.3		9.3	58.7	22.5	
7.8	28.8	12.5	G	9.4	24.0	3.5		9.4	58.8	2.6		9.2	3.8	20.7		9.4	36 7.0	8.5	
8.7	52.4	38.8	K	9.2	59.9	46.1		9.5	18 3.6	7.2		8.8	13.3	20.6	B	9.5	8.3	55.8	
7.2	59.9	17.0	G	8.9	9 0.0	7.6		9.0	16.4	9.7	K	9.0	14.5	51.7		9.5	24.1	5.4	
9.5	57 6.5	38.8		8.0	8.4	29.8	L	9.0	34.0	42.0		8.4	19.0	9.6	L	7.5	28.4	47.9	K
9.3	6.9	26.4		9.5	35.7	11.0		9.4	35.7	29.3		8.0	31.9	1.3	K	9.5	36.0	15.5	
9.5	15.8	51.4		8.5	37.2	3.6	K	8.6	45.5	0.1	K	9.3	51.1	20.2		9.5	40.8	35.0	
9.5	29.6	6.1		9.2	42.8	43.3		8.8	49.2	5.6	K	9.0	29 0.4	9.8	K	9.5	43.2	59.7	
9.1	29.9	55.4		8.6	42.9	0.5	K	9.2	19 17.5	51.5		9.4	16.0	34.0		9.5	51.2	8.3	
9.5	58 2.6	54.7		9.4	58.1	22.9		9.4	19.8	39.3		9.5	28.5	25.0		9.5	37 3.0	26.5	
9.5	13.8	48.1		9.3	58.4	11.0	B	9.5	20.9	19.6		7.4	30.6	6.6	K	9.3	6.2	13.7	B
9.5	35.6	25.7		9.3	10 1.0	29.9	B	8.8	29.0	46.2	K	7.0	31.8	36.4	L	9.5	17.6	23.8	
7.5	59 9.8	45.4	L	9.3	9.7	9.3		9.5	43.2	17.6		9.5	34.4	11.0		9.0	17.6	58.3	
8.6	28.3	25.4	G	9.4	13.7	10.0		9.4	49.3	36.3		9.5	36.3	46.4	B	9.5	23.2	57.6	
9.5	40.2	38.4		8.0	49.3	20.7	K	9.5	20 8.6	43.9		9.4	47.5	1.5		9.5	36.1	8.9	
9.1	56.8	58.2		9.4	56.8	31.6		9.2	31.9	37.9	B	9.2	51.5	33.1		9.5	55.7	58.5	
9.5	0 6.8	51.5		9.0	11 0.9	54.8		9.3	40.8	50.0		9.5	57.6	33.6		9.5	38 10.6	20.7	
9.5	9.2	17.7		9.5	34.7	44.2		9.3	57.7	22.6	B	9.5	59.9	45.9		9.5	13.1	3.9	
8.3	11.5	11.7	G	9.5	41.1	35.4		8.4	21 4.6	30.7		9.5	30 0.7	10.4		9.2	17.5	38.6	
9.1	22.9	58.5		9.0	50.3	24.7	K	8.2	35.3	34.5	R	9.4	15.4	5.6		9.5	25.5	55.1	
8.6	36.2	12.1	G	9.5	52.5	15.3		8.8	46.4	33.7		9.5	27.9	35.9		9.5	26.3	37.8	
7.0	46.3	56.7	K	9.4	12 11.9	51.7		9.5	22 4.9	34.0		9.0	34.7	27.4		8.9	37.2	8.7	K
9.0	56.3	11.1	B	9.5	17.2	12.8		9.5	12.1	47.1		9.5	35.9	16.0		6.0	54.4	25.7	K
9.5	1 4.0	54.5		9.5	19.1	36.8		8.3	14.8	10.9		8.7	59.8	55.9	K	9.5	39 9.5	19.9	
9.0	16.2	8.4	K	9.4	23.0	8.5		9.1	36.4	26.0		9.2	31 32.1	19.0		9.3	30.0	45.4	
6.3	36.0	11.9	K	7.0	24.3	0.4	K	7.5	42.3	56.0	G	8.2	39.3	34.1	K	9.0	30.7	32.6	
9.1	37.2	47.8		8.8	46.2	5.4	B	8.8	49.2	24.7		8.9	40.0	4.9	R	8.8	59.2	40.4	
8.3	54.4	17.7	K	8.7	58.9	46.0	J	8.5	55.6	21.1		9.4	42.5	11.1		9.5	40 3.4	42.7	
9.0	2 10.5	57.1		9.4	13 1.7	4.0		9.2	23 2.0	23.6		9.4	46.7	4.8		9.4	31.7	4.9	
8.5	13.0	23.1	K	8.5	2.4	8.9	K	9.0	2.4	40.6		9.5	32 1.2	23.6		8.9	39.6	7.1	
9.5	17.6	43.5	B	9.5	20.6	27.9		9.5	6.7	29.2		9.4	2.6	50.0	B	9.3	42.2	25.9	B
9.0	29.1	18.0	K	9.4	20.6	57.8		8.9	13.0	42.6		9.2	9.1	17.5		9.3	50.5	47.3	
9.5	33.0	24.3		9.0	23.9	45.5	J	8.8	14.8	18.7		9.5	13.1	7.4	B	9.4	57.8	22.3	
9.4	56.7	2.4		8.5	29.3	44.0	J	9.4	25.0	6.9		9.5	16.0	10.2		9.1	58.0	24.1	
9.0	3 4.2	42.0		8.2	51.2	20.3	L	9.3	40.1	54.5		9.3	16.1	30.5		8.6	41 7.6	28.4	B
8.3	20.9	29.9	K	8.9	53.0	54.3		9.5	24 2.5	17.5		9.4	17.4	45.9		9.1	27.9	12.4	
9.4	25.2	36.0		9.0	56.7	43.2		9.5	15.6	20.8		9.3	18.3	24.6		9.5	37.0	59.0	
8.8	29.1	52.2	K	8.4	14 6.1	39.1	J	8.5	36.5	47.5	R	9.5	31.1	54.4		9.4	40.8	9.8	
9.1	36.0	58.5		9.0	12.2	48.5		9.2	41.7	20.8	B	9.4	57.2	35.0		8.5	45.6	23.1	K
9.2	4 20.4	48.5	K	8.7	16.3	23.4		9.4	55.4	20.8	B	9.4	33 2.0	26.1		8.5	46.1	46.8	K
9.4	20.8	44.6		9.0	20.5	18.0		9.5	25 3.3	23.8		9.5	22.1	19.6		9.4	42 25.2	0.5	B
9.2	29.0	43.1	B	9.5	32.9	20.7		9.5	30.6	41.0		9.3	23.4	22.7	B	9.1	34.0	55.5	
9.3	31.3	36.7	K	9.5	41.3	8.4		9.5	37.5	47.1		9.5	52.4	9.2		9.2	39.7	38.3	
9.2	5 23.2	24.6		9.5	47.7	57.4		9.5	39.7	36.4		9.5	34 4.6	24.5		7.9	52.5	57.7	K
9.0	36.3	16.4	K	9.4	49.8	28.4		8.5	52.4	8.5	K	8.9	7.8	41.0		9.3	59.4	39.0	
9.2	40.5	24.3		7.5	49.9	0.1	K	9.3	59.6	5.6		9.3	12.8	10.0		9.5	43 2.8	5.4	
7.2	54.3	46.5	K	8.8	15 35.1	23.4	K	9.3	26 5.5	36.5		8.4	20.8	32.7	K	8.4	2.9	17.1	K
8.8	58.0	22.6		9.5	35.7	37.3		9.5	6.2	46.1		9.3	21.7	20.9		8.3	5.3	23.8	B
9.5	6 8.2	50.9		8.9	42.9	1.0	K	9.2	9.8	57.2		9.3	24.8	11.1		9.5	22.8	49.3	
9.0	12.1	44.4	K	9.2	16 2.2	35.0		9.4	16.6	52.1		9.5	25.4	59.9		9.4	42.7	28.0	
8.0	16.5	31.8	L	9.4	13.7	4.4		9.5	37.1	8.2		9.2	34.7	45.4		9.5	59.1	54.0	
9.5	57.0	2.9		9.5	14.6	23.5		9.5	27 11.4	36.4		9.5	40.5	18.2		8.0	44 25.4	13.4	K
9.3	7 1.9	15.9		9.4	30.1	5.6		9.5	15.7	7.0		9.5	40.6	10.7		9.4	26.0	40.3	K
9.1	4.7	16.6		9.4	30.5	18.0		9.4	27.3	13.9		9.4	55.0	38.2		9.5	33.0	2.0	

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	19ᵘ	+41°			19ᵘ—20ᵘ	+41°			20ᵘ	+41°			20ᵘ	+41°			20ᵘ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	44 37.9	30.2		9.5	55 19.5	18.7		9.5	3 24.9	42.6		9.5	11 0.5	30.9		9.2	20 14.1	0.8	
9.3	45.7	57.3		7.0	22.4	49.4	K	9.1	28.5	19.7		9.5	17.6	32.2		6.9	20.9	26.5	B
9.5	53.8	26.2		9.0	27.4	47.2	K	9.5	31.7	0.8		9.4	21.5	46.3		9.5	21.2	58.8	
9.4	56.2	59.0		9.4	36.3	5.2		8.7	36.5	27.1		9.2	25.1	21.5		9.5	27.3	3.6	
9.0	45 0.7	20.8		9.4	53.1	52.8		8.7	40.0	0.3		9.5	44.4	30.7		9.5	30.0	27.5	
9.5	23.8	21.9		9.1	54.9	35.3	B	9.4	44.1	51.8		9.4	47.7	52.8		9.2	30.1	26.3	B
8.5	27.4	15.2	K	9.3	59.6	13.2		9.5	4 0.7	42.0		8.0	54.6	22.5	L	8.8	33.2	25.5	B
9.3	45.0	5.9		9.5	56 4.9	58.6		9.5	3.5	38.5		9.4	12 1.8	35.4		9.5	59.0	42.5	
9.4	46.6	39.6		7.5	5.0	36.2	K	9.2	12.8	11.5		9.1	5.3	30.0		9.0	21 21.8	20.6	
9.5	48.1	58.2		9.5	25.5	25.3		7.8	15.4	48.3	K	9.4	30.1	13.6		9.5	35.7	42.5	
9.0	49.6	31.0		9.3	32.6	58.2		9.4	37.9	42.9		9.2	32.9	35.0		8.8	44.3	58.2	
9.4	51.0	15.1		9.5	33.3	29.6		9.5	42.3	4.2		9.3	53.8	13.6		8.7	45.1	22.9	
9.1	53.4	42.0		9.3	35.3	29.9		9.5	5 3.2	52.1		8.6	13 4.5	32.7		9.2	46.6	40.0	
9.4	46 3.6	17.9		9.0	38.8	17.1		8.6	9.5	4.6		9.5	11.8	11.2		8.4	22 0.0	49.4	
9.4	21.2	5.8		7.0	48.3	24.8	K	9.0	12.6	17.9		9.4	14.6	43.6		9.5	2.4	1.6	
9.5	25.1	52.6		9.1	57 4.1	52.4		9.4	29.5	51.7		9.2	19.7	56.9		9.1	12.7	55.7	
9.5	29.9	27.6		9.5	10.0	2.8		9.5	42.4	42.4		9.5	29.6	7.0		8.8	24.5	24.9	
9.5	50.0	46.0		9.2	13.2	38.2		9.5	46.9	32.4		9.4	45.0	58.1		7.0	30.9	33.1	L
9.5	55.2	46.0		9.5	15.3	14.0		9.5	53.0	15.3		9.0	55.5	59.9		9.4	35.6	4.4	
9.4	47 2.1	3.8		9.5	15.4	23.7		9.3	54.1	48.5	B	9.2	14 23.1	4.8		9.5	41.3	2.5	
9.5	11.4	49.8		9.5	25.1	12.5		8.4	59.6	1.5		9.4	25.7	36.1		9.0	54.3	40.0	
9.4	33.7	49.0	B	9.5	25.1	35.2		7.8	6 3.7	42.1	L	9.5	44.6	48.6		9.5	23 11.3	57.1	
9.4	40.6	38.0		9.3	26.6	45.7		8.7	11.9	52.6	B	7.3	49.7	8.5	K	9.5	18.5	14.5	B
9.4	44.0	19.4		9.5	40.0	33.7		8.5	18.3	31.2		9.4	15 5.4	30.6	B	8.7	21.8	28.2	K
8.4	46.1	21.5	K	9.5	41.3	45.3		9.2	22.1	48.8		9.2	28.2	25.3		7.8	24.4	31.4	K
9.4	48 25.0	0.8		9.4	47.9	44.9		9.5	22.6	39.2		9.5	30.4	59.3		9.5	25.7	2.8	
9.5	46.4	31.3		9.5	54.2	40.1		9.0	40.6	0.4		8.9	35.3	0.6		9.5	44.1	27.1	
9.1	49.6	27.4		9.3	58 8.3	3.0		9.3	45.2	8.3		9.5	16 2.2	47.0		9.3	58.3	2.7	
9.4	50.0	18.3		6.8	10.1	4.0	K	9.3	57.4	56.5		9.0	6.4	12.7		8.7	24 11.2	47.5	K
9.0	54.2	59.6		9.3	16.3	57.7		8.1	59.0	16.3	K	9.5	7.1	1.0		8.1	23.7	50.2	K
9.5	58.3	0.5		9.5	34.0	34.0		9.2	7 0.0	49.2		9.0	16.9	23.2		9.5	24.1	16.5	
8.5	49 23.9	9.2	K	9.5	35.6	27.1		9.2	22.8	28.0		7.9	37.7	46.5	B	9.5	29.7	1.7	
9.2	32.4	57.2		9.5	42.6	54.5		9.4	30.0	9.6		9.5	46.6	27.3		8.9	39.2	14.2	B
7.5	40.2	5.6	K	9.5	58.1	19.7		9.4	37.9	14.4		9.5	17 20.7	17.8		9.5	45.6	55.8	
7.5	50 5.7	28.8	K	9.5	59 3.4	10.7		8.3	48.6	2.0	K	9.0	24.4	53.9		8.4	47.3	8.8	
9.3	8.2	36.5		9.5	20.6	13.1		9.5	8 14.7	39.8		8.9	27.8	41.7		9.1	49.2	52.3	K
8.8	33.2	12.1	K	9.3	22.6	56.5		9.4	22.1	47.4		9.3	28.2	46.6		9.4	49.4	14.1	
9.1	46.4	13.0		9.3	27.5	5.3		9.4	25.9	14.2		9.2	45.8	38.0		9.3	52.4	19.7	
9.5	47.8	8.5		7.7	30.7	47.5	G	9.0	27.8	57.0		9.4	56.8	28.1		9.4	56.6	45.3	
9.4	51 33.7	49.0		9.5	39.3	35.1		8.9	29.9	7.6	K	8.9	18 14.2	47.7		9.5	25 15.0	41.9	
9.5	34.2	5.3		9.5	52.0	59.4		9.5	37.5	32.0		8.0	14.9	2.8	K	9.5	16.1	51.2	
9.0	46.0	29.2		9.4	0 13.4	49.3		9.3	42.8	54.3		9.5	16.8	14.8		9.2	32.3	42.3	
8.2	59.9	39.3	K	8.4	16.2	8.6	K	9.5	45.6	19.7		9.3	19.9	33.3	B	9.2	35.7	14.3	B
8.1	52 6.0	11.2	B	9.5	17.0	22.5		9.5	9 11.6	21.4		9.5	22.9	54.7		9.5	40.2	7.2	
8.8	7.7	3.7		8.9	30.6	59.7		9.2	15.0	49.7		8.9	23.3	36.1	K	9.4	56.6	34.7	
8.6	20.0	48.4		9.4	56.8	42.4		9.2	18.0	50.4		9.5	39.2	2.3		9.5	26 12.0	22.5	
9.5	20.8	35.3		9.5	1 13.1	0.5		9.5	19.0	18.9		9.5	43.4	52.9		9.4	24.6	30.8	
9.5	50.2	59.5		9.4	18.7	17.3	B	6.2	21.7	39.8	K	8.9	44.5	18.5		9.5	26.7	49.0	
6.5	53 4.1	52.3	G	9.4	18.8	16.1		8.6	26.5	55.7	K	9.0	19 0.0	20.8		8.5	27.0	42.4	K
9.0	5.2	15.6		9.5	34.6	29.7		9.4	38.8	24.1	B	9.5	6.9	15.8		9.2	28.6	14.0	
9.5	32.4	14.1		9.1	36.5	2.5		9.5	58.9	44.8		9.1	13.2	49.7		8.6	37.1	20.0	
9.5	32.4	21.6		9.2	49.5	10.6		9.5	59.5	54.9		9.1	15.3	47.8		8.0		8	K
9.4	46.0	49.7		9.5	51.7	58.4		9.3	10 0.0	2.5		9.5	15.3	7.6		9.5			
9.4	50.5	55.3		9.5	2 7.1	29.0		9.0	0.7	54.0		9.0	28.5	34.5	K				
9.5	54 10.7	1.8		9.5	31.9	13.1		8.3	25.1	57.5	K	8.8	30.7	1.8					
9.4	22.4	46.2		9.2	38.9	46.0		9.3	34.1	2.1		9.5	30.8	46.9					
9.3	27.3	57.0		9.0	3 2.9	38.2		9.1	36.8	23.1		8.7	44.9	54.8	K				
9.5	33.7	39.5		6.9	5.3	57.8	K	7.8	37.5	55.0	K	9.5	20 1.4	51.3					
9.5	39.4	28.9		9.0	5.5	36.9	B	9.0	44.9	44.6	B	7.7	10.8	42.5					
9.5	55 16.1	41.5		9.5	17.2	44.9		9.5	45.1	50.9		9.5	12.4	59.7					

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	20ᵘ	+41°			20ᵘ	+41°			20ᵘ	+41°			20ᵘ—21ᵘ	+41°			21ᵘ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	28 22.4	34.3		9.4	37 12.9	0.2		9.5	48 3.9	6.5		9.3	58 11.0	22.9	B	8.5	7 52.8	2.3	K
9.3	25.5	1.4	K	9.5	36.0	0.5		6.8	10.0	52.2	K	9.5	12.5	53.8		9.4	56.3	4.7	
9.5	29.1	7.0		9.3	44.2	46.0		9.4	17.8	4.8		9.5	15.4	50.0		9.5	8 11.9	17.5	
9.5	34.0	2.9		9.5	54.0	36.2		9.5	34.5	50.1	B	9.5	20.9	49.5		9.1	15.4	54.1	
6.2	39.2	16.4	K	9.2	38 10.1	45.0		9.4	37.2	34.5		9.0	22.6	42.5		9.5	40.6	35.0	
9.3	40.4	39.6		9.1	10.5	36.7	B	9.5	39.6	19.2		9.0	25.3	2.5	K	9.5	43.9	24.5	
9.5	57.6	7.2		9.2	34.2	22.8		9.4	49 28.4	47.0		7.0	26.5	3.1	K	9.5	53.7	43.2	
9.4	29 0.2	0.8	B	8.5	35.6	19.1		8.7	33.4	15.1	K	9.5	37.1	8.6		9.3	9 0.1	42.0	B
9.0	12.8	33.5	B	7.0	41.3	41.8	G	7.7	33.4	1.6	K	9.3	39.2	51.0	B	9.1	9.3	7.1	
9.3	16.9	32.7	B	9.5	59.7	33.7		9.5	48.1	0.3		9.5	59.2	7.5		9.2	19.9	48.9	
7.7	24.5	29.9	K	9.5	39 19.6	45.3		9.5	57.0	45.9		8.2	59 12.0	52.1	K	8.5	22.3	3.0	
9.4	42.6	38.7		8.6	22.6	35.1		6.9	50 1.3	57.8	G	9.3	20.3	8.9		8.7	27.1	26.3	
9.3	45.2	12.8	B	9.5	32.5	5.2		8.9	10.9	41.3	K	8.3	24.1	54.7	K	9.5	36.4	6.3	
7.2	46.7	13.2	L	9.5	53.1	20.9		9.4	34.4	59.6		9.5	25.5	34.7		9.5	37.3	50.6	
9.1	57.4	52.2		9.5	40 5.8	9.5		9.2	36.0	0.8		9.0	47.9	51.0	K	8.5	53.3	17.3	
9.5	30 5.2	32.5		8.1	6.9	56.6	K	9.4	48.5	45.3		9.4	57.3	44.0		6.5	56.5	25.4	G
9.5	9.2	27.9	B	9.5	10.6	11.9		9.0	54.5	38.3	K	9.5	0 36.3	36.2		8.9	10 6.1	49.8	
6.7	9.2	23.2	G	9.1	45.2	11.5		9.5	56.9	43.8		9.4	50.0	0.9		9.4	14.9	33.3	
9.4	39.5	54.5		9.2	50.7	12.7		9.5	51 21.2	28.5		9.5	50.7	32.4		9.4	17.2	52.5	
9.2	39.8	42.4		8.5	41 2.6	58.0	K	9.1	33.5	5.1		9.4	51.5	18.8	B	8.8	23.0	31.4	
9.5	31 11.4	45.0		8.8	6.5	44.6		8.8	50.0	34.6		9.1	1 0.6	47.8	B	8.0	31.8	15.6	G
9.5	16.3	7.4		9.3	10.6	30.5		9.2	52.7	20.5		9.5	8.7	51.3		8.7	34.6	1.8	
9.1	18.8	36.0		9.5	26.1	51.3		7.3	52 2.9	7.9	B	9.5	20.8	3.2		9.2	37.2	47.5	
9.2	18.8	37.9		6.8	57.3	53.0	K	7.4	10.0	53.4	G	8.5	35.2	39.3		8.6	39.8	56.1	
9.2	24.4	17.6		9.5	42 0.0	54.7		9.5	28.4	4.3		9.4	41.0	19.9		8.7	52.5	19.9	
9.1	31.7	7.4		9.5	2.0	18.0		8.8	33.2	19.2		9.5	2 4.9	43.9		9.3	54.3	52.4	
9.5	46.3	55.0		9.3	2.5	33.0		9.5	47.6	49.1		9.4	5.4	24.8		6.3	11 0.3	38.7	L
9.5	47.3	25.2		9.5	16.2	18.1		9.5	53 1.7	40.2		9.1	8.2	54.8		9.3	15.7	9.7	
9.5	53.6	10.8		7.3	25.8	31.9	L	6.9	9.4	22.9	K	9.5	20.5	56.1		9.5	18.0	13.5	
9.5	32 6.9	49.8		9.1	36.1	32.0		9.1	13.1	54.2		9.5	34.8	3.6		9.5	20.0	16.1	
9.1	46.6	37.2		9.3	50.7	26.1		8.6	21.0	5.5		9.5	49.7	16.8		9.2	24.6	4.0	
9.4	57.3	50.8		9.4	43 5.7	22.7		9.3	30.9	55.2	B	9.1	52.5	25.9		9.3	27.3	23.5	
8.5	33 0.8	40.0	B	8.2	7.7	10.6	K	9.4	36.7	59.9		9.5	55.0	27.9		9.0	40.0	29.5	B
9.0	3.4	42.0		8.9	13.4	0.1	R	9.2	38.6	49.0	K	7.9	58.3	0.1	K	9.4	47.0	27.4	
9.5	3.4	47.4		8.2	17.3	43.5	K	9.2	54.9	30.3		9.0	3 11.5	58.7		9.5	56.6	15.2	
7.8	7.1	33.9	L	9.2	21.4	34.0		6.5	54 4.8	45.9	K	8.9	38.0	53.7	B	9.5	12 2.2	20.6	
9.2	19.6	34.0		7.3	26.5	13.4	K	9.5	10.2	10.7		9.5	41.9	37.4		9.3	8.5	18.9	
9.4	30.8	10.6		9.4	30.6	16.9		9.5	13.3	38.9		9.0	42.2	46.1	B	9.0	11.0	19.9	B
9.3	32.5	44.7		9.5	39.5	34.2		9.4	14.6	28.3		9.2	53.6	46.3		9.3	28.0	53.7	
9.5	35.1	30.0		9.4	44 5.6	21.2		9.4	52.0	16.2		9.5	4 10.3	56.9		9.5	36.1	47.3	
8.6	59.9	23.9		8.5	15.8	4.9	K	9.2	55 5.1	1.0		7.6	13.8	50.8	K	8.5	38.4	37.1	L
9.4	34 4.5	11.0		9.5	29.1	26.1		8.7	6.0	5.0	R	9.5	18.7	50.0		9.3	42.0	35.2	B
9.2	16.7	7.8		8.9	52.2	49.8	K	8.7	7.2	37.5		9.5	34.0	43.1		9.3	45.4	3.7	
8.5	22.6	30.1	K	8.9	57.7	28.5	B	9.4	26.3	58.8		9.5	42.8	4.8		9.5	52.0	32.1	
6.5	24.1	44.8	K	9.5	45 0.0	48.4		9.5	56 10.4	28.7		9.5	43.5	37.6		9.2	56.2	43.6	B
9.2	44.3	34.0	K	9.2	11.4	45.0		9.5	48.3	3.9		9.5	56.0	58.6		9.5	13 18.5	7.9	
9.3	47.9	6.8		9.3	13.6	52.3		9.5	51.3	59.9		9.5	57.6	54.7		8.5	23.1	50.7	K
9.5	35 33.0	11.3		9.5	22.0	2.3		9.5	57.4	56.1		9.5	5 37.4	16.5		9.3	34.6	2.1	
9.5	42.5	19.6		7.3	24.9	50.6	K	9.5	57.6	4.7		9.5	6 6.4	59.2		9.5	35.4	36.3	
9.0	48.0	52.4	K	9.0	46 1.8	55.0		9.4	57 5.7	0.1		9.5	11.3	37.9		9.4	43.0	36.5	
9.4	52.2	58.1		9.5	3.1	5.2		9.5	8.4	28.7		9.5	13.0	14.1		9.4	44.9	2.1	
9.4	36 28.6	31.2		9.3	25.2	4.1		8.8	15.8	10.8	K	9.0	14.0	21.5		9.5	51.5	27.5	
8.8	29.6	37.3		9.2	33.6	13.1		9.2	43.1	1.4		9.5	17.8	48.8		9.5	14 10.0	51.9	
9.4	30.0	2.7	B	9.4	33.9	7.5		9.5	48.6	23.3		9.4	27.2	8.1		9.0	13.3	20.0	
8.0	34.5	29.5	B	8.4	47 8.2	56.0	L	9.4	48.6	13.5		9.4	35.1	59.8		8.3	24.9	37.7	K
5.3	43.3	12.1	G	7.7	16.4	25.8	G	8.6	48.6	6.5	K	9.4	52.0	54.3		9.4	43.3	30.7	
9.5	47.5	4.7		9.5	18.8	30.0		9.5	49.2	52.4		9.0	56.7	45.8	K	9.5	45.8	10.1	
8.8	37 5.2	25.0		9.2	37.5	32.5		9.4	58 7.1	21.7		9.5	7 5.5	18.7		9.5	49.5	30.6	
9.2	8.0	30.1		9.5	54.1	9.0		9.5	8.5	17.7		9.5	13.8	36.2		9.5	15 0.3	35.4	
9.5	10.1	59.7		8.8	57.4	48.9		9.5	9.3	20.8		9.5	14.4	48.7		9.5	0.8	39.5	

4101—4160				4161—4220				4221—4280				4281—4340				4341—4400			
	21ᵐ	+41°			21ᵐ	+41°			21ᵐ	+41°			21ᵐ	+41°			21ᵐ—22ᵐ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	15 4.5	38.3	K	9.2	23 59.5	46.4		9.3	33 29.5	22.0		9.5	44 14.0	27.8		9.0	53 54.9	14.8	K
9.5	12.5	18.4		9.5	24 16.6	9.2		8.9	33.9	22.2	B	8.8	21.3	52.5	B	9.3	55.3	42.5	
9.5	25.0	40.3		9.1	29.7	5.6		9.0	43.6	53.9		9.4	25.0	53.2		9.3	54 4.0	3.3	
8.8	26.8	22.3	K	9.5	35.9	33.1		8.0	46.0	4.4		8.0	28.1	11.7	B	7.1	14.2	53.3	K
7.8	33.9	22.5	K	7.5	36.3	25.2	L	8.5	47.5	4.6		9.5	54.3	58.4		9.0	18.6	59.5	
9.4	40.7	23.9		9.5	42.4	6.4		9.5	34 41.1	12.0		9.3	45 16.4	28.1		9.5	38.4	52.5	
9.0	46.3	27.3	K	9.5	44.3	14.9		9.5	41.7	16.0		9.3	20.0	36.3		8.9	45.8	36.3	
9.0	46.3	49.6		9.5	47.3	50.5		9.5	56.8	38.8		9.3	22.4	44.0		9.4	55 1.8	10.2	
8.4	56.0	17.1	K	7.7	57.6	34.6	K	9.5	35 1.7	1.7		9.4	39.7	4.5		9.0	26.1	19.8	
8.7	16 6.3	28.2	K	9.5	25 0.0	19.4		9.5	10.1	29.1		8.5	56.1	51.3	K	8.8	40.4	59.1	
9.4	12.2	10.9		8.7	4.2	38.2	K	9.0	20.3	27.5		7.3	46 4.0	41.0	K	9.5	42.7	1.5	
9.5	33.6	54.3		9.5	14.5	49.9		9.0	29.9	59.4		8.7	9.5	6.2		9.1	45.8	28.8	
9.4	50.9	7.1		9.5	14.5	7.5		9.1	37.5	15.0		8.2	15.0	58.1		8.9	50.5	19.6	
8.8	52.0	46.3		8.7	42.0	40.4	K	9.0	38.7	5.9		9.0	24.4	58.4		9.4	56 1.7	0.8	B
8.9	54.3	14.5		8.6	43.4	10.1		9.5	44.0	15.7		8.0	27.3	10.6	K	9.5	15.6	25.8	
9.5	55.9	40.3		9.4	50.9	20.2		9.3	54.0	16.0		9.4	28.5	57.7		8.4	27.6	43.7	R
8.5	17 14.4	46.5	K	9.5	56.7	13.9		7.6	36 14.4	54.5	B	9.4	28.9	0.4		9.4	28.7	23.1	B
8.5	32.0	47.7	K	7.7	26 7.3	6.5	L	9.5	30.7	13.7		9.5	38.6	18.3		9.5	39.3	2.9	
9.5	43.0	37.9		9.5	12.6	5.1		9.0	33.1	56.0		8.2	40.3	43.6	K	9.3	57 13.8	18.3	
9.4	52.3	9.0		9.4	25.0	6.3		9.5	36.1	3.0		9.5	46.1	46.6		9.5	16.5	51.9	
9.5	57.3	28.5		9.5	30.1	23.3		7.5	40.6	9.6	B	9.5	47 7.2	51.9		9.0	40.6	12.0	K
9.4	18 1.0	11.4	B	9.1	34.2	3.6	B	9.5	44.0	13.8		9.5	32.0	59.5		9.3	46.3	31.6	
9.4	3.4	57.6		9.4	44.5	11.3		7.0	49.2	46.8	G	9.5	35.5	35.8		8.8	51.1	18.8	K
9.2	32.9	59.0		7.0	27 1.3	39.2	L	9.4	37 19.5	21.3		9.3	56.7	23.4		9.3	53.7	1.4	
9.5	43.7	21.6		9.5	4.8	13.5		9.3	45.8	52.1		9.5	48 10.8	18.2		9.4	55.8	8.3	
8.8	19 40.7	32.7		9.3	7.0	37.4	B	9.5	49.7	2.4		9.5	26.4	34.5		9.1	58 3.0	49.5	K
9.5	42.1	49.4		9.5	19.1	0.3		9.5	50.4	9.8		9.5	27.4	57.9		9.1	7.0	59.1	B
9.4	50.4	41.2		9.5	24.7	15.7		9.4	38 7.8	26.4		9.2	40.0	32.8		9.4	35.5	1.6	
8.7	56.8	1.0		9.5	36.5	26.7		9.0	14.3	14.9		8.2	52.6	59.3		9.4	43.2	50.6	
9.3	20 8.4	9.4		9.5	57.9	23.2		9.3	26.8	5.9		9.0	49 35.5	19.1		8.5	44.9	37.8	
9.5	11.8	24.8		9.4	28 0.1	13.1		9.5	46.0	40.3		8.5	39.0	15.4		9.2	51.2	20.8	
8.5	13.9	54.0	K	9.1	1.1	43.5		9.4	39 5.0	52.9		9.4	42.4	26.2		9.5	59 4.0	25.0	
9.3	15.0	6.6		9.4	3.3	40.7		9.4	23.3	35.1		9.2	51.0	22.2		9.5	4.3	59.6	
8.2	21.7	5.8	B	9.2	25.8	35.1		9.5	41.2	46.1		9.5	56.3	39.8		9.3	6.9	42.9	
9.5	31.9	25.1		9.5	27.9	37.6		9.1	41.9	39.8		9.5	50 15.2	27.4		9.5	7.2	54.1	
9.5	41.4	29.6		8.2	34.5	3.4	B	8.0	50.2	29.9	B	9.0	17.2	49.3		9.2	34.1	31.0	
9.5	53.0	1.8		9.5	41.3	45.0		9.4	53.6	55.9		8.6	44.1	54.3	K	9.5	41.6	2.7	
8.0	21 14.0	50.5	K	9.4	45.1	30.1		9.5	58.3	15.6		9.2	56.4	9.9		8.2	49.2	15.4	L
8.4	17.3	54.2	K	7.2	58.4	45.7	K	9.4	40 1.3	16.3		9.4	51 3.5	59.5		9.4	57.7	6.5	
9.5	17.3	56.8		9.0	29 15.6	59.9		9.5	16.2	3.5		9.3	6.6	3.1		8.9	59.2	9.7	
8.6	23.7	11.8	B	9.5	43.8	14.1		8.0	15.9	43.3	B	9.0	8.3	37.8	K	8.8	0 2.6	16.4	
9.0	30.9	24.6		9.5	46.1	35.0		9.5	25.1	56.2		9.5	11.0	23.8		9.5	6.9	41.0	
9.3	32.0	15.4		9.5	30 18.3	54.0		9.4	28.0	59.2		8.1	13.2	41.1	B	9.4	13.2	47.0	
9.0	35.4	53.4	K	9.5	19.5	58.8		9.2	33.0	18.9		7.5	14.3	55.8	K	9.1	1 5.8	47.1	
8.8	56.8	31.0		7.6	25.9	17.0	K	9.4	41 2.5	40.3		9.0	17.8	24.5	B	9.4	12.5	58.3	
8.7	22 1.7	56.5	K	9.5	31.6	25.4		8.2	5.8	48.4	B	9.5	28.9	8.6		9.4	13.1	49.2	
9.3	9.4	57.9	K	8.9	35.3	20.1		8.7	17.0	36.3		9.1	52 6.0	58.7		9.1	29.1	48.0	
8.4	10.5	22.4		9.5	59.1	0.8		8.2	23.6	20.9	B	9.5	23.5	18.5		9.3	31.7	50.8	
9.5	23.6	8.0		9.5	31 20.9	11.6		9.4	26.5	15.7		9.4	31.8	6.1		9.3	32.4	10.0	
8.5	24.3	27.2		9.1	22.2	24.5	B	8.6	28.3	8.4		9.3	49.8	57.6		9.2	42.8	47.7	R
9.5	29.7	56.4		9.5	25.6	24.4		9.5	42 10.3	7.6		9.3	56.7	23.2		9.5	44.0	17.0	
8.8	46.2	46.5		9.0	44.9	28.2		9.5	12.0	49.8		9.5	58.4	4.9		9.1	2 8.2	49.2	
8.0	50.0	14.5	L	8.5	32 14.8	13.7	K	9.5	17.1	3.7		7.3	59.0	0.3	K	9.3	9.7	53.4	
9.5	50.5	26.8		9.5	41.3	48.9		7.5	20.5	40.2	K	9.4	53 5.6	12.9		9.5	18.3	18.0	
9.1	53.3	47.8		9.5	48.5	51.0		7.9	22.3	29.3	K	8.1	17.0	15.9	K	9.5	19.5	21.2	
9.3	23 2.6	45.9		9.5	55.3	8.6		8.1	53.2	7.9	K	9.5	28.4	29.9		9.3	25.0	49.5	
9.5	7.5	58.2		9.5	55.9	21.3		7.5	43 16.7	41.1	K	8.7	31.3	47.1		9.4	28.2	25.8	
9.5	13.2	49.5		9.3	33 3.4	45.8		9.4	31.5	36.4		8.7	32.0	55.5	K	9.5	48.4	21.2	
9.5	26.8	23.5		9.4	6.6	6.0		9.5	36.0	56.7		9.1	47.1	52.9	K	9.5	51.3	37.9	
8.7	32.4	26.5	K	9.0	14.3	11.3		9.5	53.9	44.4		9.5	52.2	4.5		8.7	3 28.4	45.6	K

4401—4460				4461—4520				4521—4580				4581—4640				4641—4700			
	22h	+41°			22h	+41°			22h	+41°			22h	+41°			22h—23h	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.9	3 28.9	54.5	K	9.5	14 28.4	41.0		9.5	24 4.8	0.3		9.5	34 41.3	57.3		8.9	50 3.2	9.3	
9.0	31.5	11.3		9.1	28.6	20.1		8.6	16.7	59.0	K	8.2	35 10.4	39.6	L	9.5	18.3	45.8	
8.8	41.4	9.7		8.8	36.4	9.7	K	9.5	21.4	20.5		7.5	42.1	39.0	K	9.5	38.2	12.0	
9.5	55.5	1.5		8.8	15 2.1	43.5		8.4	26.6	48.4	K	9.2	49.2	10.2		9.5	50.7	53.9	
9.4	4 20.5	57.4	B	9.4	2.3	10.7		9.5	33.8	40.9		9.1	49.3	30.4		9.1	53.8	24.0	
9.1	23.4	43.2	B	9.5	8.7	11.2		9.1	59.7	34.0		9.5	36 23.8	53.4		9.2	55.8	37.2	
9.3	31.0	38.2		8.0	10.0	4.1	K	9.0	25 0.9	37.3		9.5	31.7	43.4		9.5	51 2.9	12.7	
8.9	33.2	59.1	K	9.5	31.6	53.8		8.3	13.7	51.4	K	9.1	42.5	1.9		9.1	3.2	3.3	K
8.8	51.0	28.0		6.5	39.9	21.5	K	7.5	13.7	28.7	K	9.0	50.5	36.8		9.1	22.8	54.7	
9.4	5 0.0	54.6		9.5	49.5	16.0		9.2	31.5	30.9	K	9.2	37 5.3	44.5		8.5	27.1	9.3	K
9.4	2.3	4.4		9.4	53.0	19.3		9.5	40.8	43.1		9.3	10.8	39.6		9.1	28.0	57.7	K
9.5	22.7	42.0		9.4	16 12.4	9.2		9.4	45.5	10.8		9.4	13.9	26.8		9.1	30.8	42.5	
9.0	32.4	12.8	K	9.5	14.1	34.0		9.5	51.7	53.5		8.9	27.3	33.8		9.5	47.7	2.5	
9.1	32.4	28.0		9.5	31.8	54.5		9.5	26 7.6	43.4		5.2	39.6	3.8	G	9.5	47.8	30.6	
9.4	34.5	25.5		9.4	40.8	22.3		9.2	27.4	24.1		9.2	48.1	43.9	B	9.0	52 49.2	5.6	
9.5	47.8	48.5		9.4	17 12.7	3.7		9.2	28.4	27.1		9.5	56.4	24.8		8.5	53 3.2	3.2	
9.3	56.4	36.9		7.8	13.7	19.5	K	9.3	34.7	43.7		8.5	38 3.5	19.3		9.0	9.8	19.6	
9.1	6 7.8	20.6		9.0	21.0	11.5		9.5	56.8	24.2		9.2	30.2	4.2		9.5	31.7	6.0	
9.3	40.5	35.9		9.5	38.0	6.7		8.5	27 1.3	38.7		9.0	30.6	48.7		9.5	35.2	17.7	
8.1	7 2.3	4.3	B	9.3	44.8	49.7		8.8	7.1	53.2	K	9.2	52.5	23.8		9.4	37.6	36.5	
9.5	2.5	18.5		9.4	18 2.2	44.1		9.3	10.0	54.1		9.4	52.5	39.0		9.5	54 14.4	58.6	
9.5	11.7	20.5		9.5	13.0	29.8	B	8.9	21.3	48.1	B	9.3	55.4	33.3	B	9.5	20.0	46.3	B
9.3	19.6	36.5		9.5	18.9	58.1		8.1	40.8	9.1	L	8.0	39 10.6	7.9	K	9.4	58.0	47.8	
8.9	31.9	18.9		9.5	23.4	55.9		8.9	49.0	46.3	K	9.5	28.2	15.5		3.7	55 17.9	33.0	K
9.5	36.7	59.3		9.2	28.5	2.7		9.3	49.6	53.4		9.2	37.8	18.9		6.2	59.0	58.2	K
8.5	39.7	45.1	K	9.0	36.7	51.4		9.0	28 0.1	32.5	K	9.5	43.1	52.6	B	9.4	56 21.4	35.2	
8.9	43.8	53.6		9.1	37.8	56.7		9.5	8.4	23.6		9.5	40 8.0	27.2		9.4	27.3	49.1	
9.3	54.8	13.2		9.3	42.6	44.6	B	9.5	21.2	52.2		9.5	12.5	53.2		8.7	28.6	26.8	L
9.2	8 1.1	59.9		7.3	59.0	18.1	K	9.5	39.2	25.5		9.0	37.2	2.6	K	9.0	35.3	45.8	B
9.5	16.6	43.0		9.4	19 3.5	35.5		9.5	41.7	55.9		9.4	41 0.0	55.6		9.2	50.0	11.6	
8.7	16.6	23.2	K	9.1	11.7	46.1		9.0	59.8	41.4		8.7	15.4	46.0	L	9.3	57 48.2	1.4	
9.5	19.0	17.0		8.9	20.0	42.8	R	9.5	29 21.5	11.3		9.4	41.5	6.3		9.1	58 0.1	5.4	
8.2	20.7	25.8	K	9.5	23.0	57.5		9.5	22.5	26.1		9.5	42 22.6	19.3		9.0	13.0	18.5	
9.1	30.4	23.0	K	9.4	23.8	34.2		9.5	23.0	19.2		9.3	25.6	4.5		8.8	15.0	11.2	K
9.3	9 5.0	23.0		9.1	44.2	12.5	K	9.5	29.8	46.9		8.5	49.2	12.0	K	8.9	26.8	53.8	
9.5	14.8	11.8		8.6	46.7	39.4	K	9.2	38.0	56.8		9.3	52.0	59.9		7.6	59 26.1	0.9	L
9.5	19.0	15.7		9.5	53.1	35.2		9.5	30 8.2	25.5		9.5	43 2.3	1.0		7.5	45.7	49.9	L
9.5	31.6	4.7		9.4	59.8	43.3		9.4	28.5	49.0		9.0	8.0	17.3	K	9.0	46.6	5.1	
9.3	36.7	16.7		9.1	20 0.0	36.4		9.0	49.8	47.2		7.0	8.7	52.1	K	9.5	50.0	0.7	
9.5	10 6.1	46.0		9.5	1.6	37.0		9.2	31 1.5	25.7	B	9.5	18.5	37.9		7.3	54.2	53.6	L
9.2	15.5	1.3		9.5	13.7	3.6		8.8	11.2	13.0		9.5	34.9	20.4		9.5	0 23.0	18.2	
9.3	20.2	30.1		9.4	30.8	55.1		9.5	25.2	2.3		8.2	41.9	9.2	K	8.9	23.7	8.3	B
8.8	24.1	42.0	B	9.2	54.0	53.1		9.0	51.3	23.1		6.1	50.0	11.1	K	9.5	30.0	22.8	
9.5	29.2	59.9		7.3	21 14.3	16.7	K	8.9	52.3	39.4	B	8.0	44 11.2	14.4	K	9.4	41.5	50.6	
9.3	31.3	3.1		9.5	26.6	27.9		8.4	54.8	29.3		9.1	17.3	54.8		9.3	47.1	8.2	B
8.8	45.6	18.5		9.3	33.2	13.3		9.5	55.3	45.7		9.0	46 7.3	47.6		9.5	1 1.3	8.8	
8.7	11 1.2	16.0	K	9.0	38.9	51.1		9.5	59.8	40.1		9.5	39.2	11.2		9.4	12.1	32.0	
9.5	23.8	38.4		9.4	55.1	19.7		9.3	32 3.5	57.9		9.2	45.1	57.4		9.3	49.5	30.7	
9.0	31.7	48.6		9.5	22 8.4	43.9		8.5	3.5	3.5	K	9.5	47 6.3	8.6		9.5	2 20.8	5.8	
9.5	35.1	28.2		9.5	19.5	17.7		9.5	21.6	36.6		9.3	7.8	51.8		8.3	28.8	23.1	K
9.4	50.2	51.1		9.4	29.4	12.4		7.5	46.7	25.5	K	8.4	28.2	15.1	K	8.2	34.3	20.1	K
9.5	12 8.4	40.1		9.5	50.6	20.0		8.5	55.4	47.3		9.5	48 0.8	3.6		8.1	37.2	55.4	K
9.4	20.1	7.4		9.4	23 3.8	59.2		7.3	33 15.2	25.8	K	9.5	8.0	6.8		8.9	37.6	45.7	
9.4	25.5	12.7		9.3	5.1	37.7		9.4	21.3	59.3		8.0	10.4	43.8	K	9.5	48.9	9.6	
9.2	35.8	21.7		9.5	12.7	32.9		8.3	33.0	54.2		8.5	24.9	43.4	K	9.5	53.5	14.6	
7.8	36.2	25.1	K	8.9	26.0	29.5		9.4	46.9	2.4	B	9.5	56.6	53.5		8.8	58.3	36.0	
9.3	13 13.3	44.9		9.3	37.1	25.6		8.5	49.2	29.3	K	8.7	49 17.7	10.7	K	9.5	3 9.2	45.9	
9.2	23.5	58.5		9.5	38.8	56.9		9.5	34 7.6	5.9		9.5	45.5	42.4		9.5	16.5	17.3	
9.3	30.6	16.8		9.1	51.9	15.0		9.5	12.1	24.0		8.5	47.2	59.7	K	9.3	23.9	58.4	B
8.5	14 3.1	7.1	K	9.5	59.5	10.3		8.2	35.4	51.4	K	9.5	59.3	45.7		9.5	29.1	37.8	

4701—4748				4749—4796				4797—4844				4845—4892				4893—4939			
	23ʰ	+41°			23ʰ	+41°			23ʰ	+41°			23ʰ	+41°			23ʰ	+41°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	4 5.0	35.9		8.7	12 46.0	27.8	B	9.4	22 53.7	16.6		8.8	34 24.7	15.1		8.7	47 54.8	26.9	
9.4	18.4	47.3		9.4	50.8	52.3		9.1	23 37.2	29.0		8.9	49.8	51.9	K	9.5	48 36.6	32.4	
9.5	23.8	10.7		8.5	55.8	55.7		9.1	45.8	6.6	K	9.5	35 0.3	19.8		9.1	40.9	21.4	K
8.3	23.9	5.1	K	5.9	13 0.0	16.4	G	9.1	50.2	57.7		9.5	12.5	41.7		9.1	44.5	19.1	
9.5	27.4	52.1		9.5	24.7	57.2		9.1	24 0.4	24.6		9.2	30.9	36.8	K	8.5	49 13.0	42.6	K
9.5	33.1	2.9		9.5	25.5	45.2		8.7	18.0	15.7	K	9.1	51.4	10.0		9.3	17.0	2.4	
9.5	38.4	42.2		9.1	14 15.2	31.4		9.3	20.4	17.1		9.5	36 8.3	8.1		9.4	18.8	35.2	
9.4	52.3	49.2		9.5	46.8	3.8		9.3	25.5	20.6		9.4	54.3	42.2		9.4	26.2	1.7	
9.5	5 7.9	4.7		9.5	50.5	8.4		9.5	44.6	7.6		7.7	55.7	39.5	R	9.0	31.7	46.8	K
9.5	39.6	22.1		8.8	15 24.2	40.9	K	9.0	54.0	52.1		9.5	37 11.0	49.2		6.0	44.8	50.9	K
9.4	48.8	54.7		9.5	33.2	32.4		9.5	55.5	22.1		8.7	27.9	35.2		8.0	51.5	7.0	
8.8	6 9.7	42.7		9.5	37.3	2.2		8.9	25 15.5	8.0		8.7	28.5	15.0	K	9.3	50 3.8	34.4	
8.8	10.8	58.1		9.2	47.0	48.1		9.0	30.1	17.4	K	8.8	35.2	50.0		9.5	17.8	34.6	
7.0	15.0	16.4	K	9.5	16 25.3	59.5		9.5	53.8	38.2		9.1	48.5	26.6		8.2	19.7	20.4	K
8.8	24.2	29.5	K	9.5	29.3	40.9		9.5	26 5.9	17.2		9.3	54.7	52.0		8.5	51 11.9	28.2	K
9.5	51.5	56.6		9.2	33.1	50.3		9.5	42.7	57.3		9.3	38 3.0	34.7	B	9.3	16.8	35.8	
9.5	53.7	16.0		9.5	17 17.2	36.1		9.4	57.3	59.5		9.5	3.9	50.1		9.5	20.1	26.2	
9.5	7 29.2	59.2		9.2	19.8	16.7		9.5	27 13.8	49.1		9.0	10.6	7.0	K	9.5	28.0	11.9	
9.5	31.8	29.3		9.5	51.1	53.8		9.4	19.7	7.7		8.2	28.1	25.6	K	9.5	29.6	51.5	
9.0	36.7	22.7	B	7.2	18 6.0	25.6	K	9.5	53.4	52.0		8.0	39 28.9	13.0	K	9.5	52 19.6	49.7	
9.3	54.0	55.9		9.3	6.4	12.0		9.5	56.5	18.4		9.5	40 18.2	11.6		9.4	26.3	4.8	
9.5	8 1.8	13.0		8.8	18.8	11.5		9.4	28 10.8	59.6		9.5	20.7	48.0		9.3	26.9	12.4	
9.3	17.8	21.0		9.2	21.4	8.0		9.5	27.2	45.0		8.8	39.7	40.4		9.4	57.6	28.1	
9.5	20.9	35.6		8.7	35.5	6.7		7.8	29 8.1	50.8		9.3	41 19.3	3.6		7.8	53 1.8	20.6	K
9.5	22.6	53.0		8.0	58.0	44.3	L	9.5	25.1	59.3		7.7	21.0	22.9	K	9.2	11.5	54.1	
9.5	34.6	29.0		9.5	19 8.2	54.5		8.7	33.0	37.1		9.5	22.3	48.4		9.5	45.6	27.3	
9.5	38.1	23.5		9.5	14.8	21.7		9.5	30 44.4	5.0		9.1	44.7	57.9		9.4	54 13.9	17.8	
9.5	55.8	55.5		9.5	18.3	4.8		9.4	31 3.9	10.1		9.2	42 18.8	30.1		6.5	20.6	32.8	G
8.2	58.9	47.6	K	8.8	22.4	54.6		9.0	13.0	49.8		9.5	24.0	48.1		9.5	30.0	46.9	
9.3	9 10.7	16.5		9.5	24.8	21.0		7.0	20.9	42.2	K	9.5	26.7	10.9		9.1	31.8	16.5	B
9.5	32.2	5.1		8.5	37.0	3.2		9.5	24.0	5.2		9.4	51.8	3.3		8.9	44.6	19.0	K
9.5	39.8	59.3		7.8	39.8	45.5	L	9.4	32.7	57.8		9.0	43 10.6	4.3		8.8	55 7.2	20.4	B
9.4	45.0	30.5		8.0	42.1	6.6		8.9	41.6	52.4	K	9.1	20.2	59.4		6.8	43.3	55.6	G
9.1	55.5	42.6	K	8.8	50.6	23.1		9.5	51.4	8.8		7.8	26.4	1.2	K	9.4	56 5.2	25.9	
9.1	10 7.4	49.8		7.8	20 1.0	24.4		9.5	58.2	39.7		9.5	36.0	34.7		7.6	7.6	31.8	J
9.3	10.3	50.4		8.3	5.8	12.8	K	9.4	58.8	17.8		8.4	37.6	4.7	K	7.7	19.2	13.9	K
9.5	13.2	2.9		8.3	15.6	40.0		9.5	32 0.5	53.0		6.7	44 17.0	16.0	G	8.5	19.3	23.3	
9.4	22.9	32.8		9.3	50.5	29.1		9.1	15.5	10.8	B	9.1	20.3	48.4		9.5	38.6	34.4	
9.4	27.6	47.2		9.3	55.0	19.4		9.5	35.4	59.6		7.8	41.7	25.2		9.2	42.5	59.3	
9.3	40.4	2.6		8.8	59.8	37.5		9.5	33 1.9	19.0		9.3	44.6	45.4		8.2	51.9	46.9	G
8.2	47.2	47.8	K	9.2	21 10.7	11.7		9.1	10.0	46.9		9.5	45 14.8	58.9		6.0	57 12.2	18.1	K
9.0	50.4	56.4		9.5	15.8	56.9		9.5	21.4	48.2		8.8	46 3.8	15.5		9.5	15.6	32.7	
9.4	11 6.5	17.2		7.4	46.8	36.8	L	9.5	35.1	7.4		9.3	8.4	36.2		9.1	58 5.7	47.5	
9.5	7.5	22.9		9.1	58.0	10.8		9.5	35.8	34.1		9.2	20.7	27.8		9.0	16.0	50.6	
9.3	14.9	25.5		9.5	22 3.5	56.9		9.5	51.9	49.6		9.5	43.6	31.4		8.0	57.1	56.5	K
9.5	25.1	14.4		8.5	14.1	14.5	R	6.8	56.1	2.6	K	9.5	45.8	45.9		9.5	59 25.4	12.2	
9.5	12 24.0	59.2		8.0	15.0	21.0		9.5	34 14.8	46.8		9.2	47 6.5	32.5		9.4	53.9	5.7	
9.5	38.4	37.5		7.0	17.6	33.5	L	9.5	22.2	37.2		9.5	36.7	36.3					

Zone +42°

1—40				41—80				81—120				121—160				161—200			
	0h	+42°			0h	+42°			0h	+42°			0h	+42°			0h	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	0 2.7	20.0		6.0	8 46.8	47.5	K	9.5	20 28.7	27.5		8.9	29 42.7	45.9	K	8.0	37 30.2	36.0	K
9.5	4.9	53.0		9.5	50.4	53.6		9.5	48.5	30.5		9.5	52.2	40.0		9.5	57.6	9.0	
9.2	8.2	48.5	B	9.1	54.4	41.5		9.5	21 31.2	48.1		9.4	30 9.1	40.0		9.5	58.2	20.0	
9.5	34.6	5.5		9.1	9 3.9	42.7	K	9.5	43.9	26.1		9.2	9.2	58.7	K	8.8	38 15.5	38.0	K
9.5	52.4	3.7		9.5	30.5	30.7		9.3	50.5	51.7		9.5	24.3	45.6		9.5	19.0	52.3	
9.2	54.4	38.5		9.5	50.4	14.8		9.5	22 7.1	25.6		9.5	32.2	11.7		9.5	21.3	36.4	
9.2	1 11.0	57.3	K	9.4	10 28.3	18.6		9.0	29.6	35.0	B	9.1	50.5	39.9	B	9.5	23.8	12.1	
8.1	2 0.9	14.8	K	5.9	11 5.7	59.6	K	8.8	32.1	35.5	K	9.5	31 7.2	20.0		9.0	30.5	42.7	K
9.3	19.8	19.0	K	9.4	20.4	43.3		9.1	43.5	20.1	B	9.5	7.7	34.2		9.5	37.6	59.9	
8.8	25.4	38.9	K	9.5	21.6	12.9		9.5	56.9	41.6		9.0	27.8	7.8		9.3	56.9	52.3	
9.0	25.9	34.5		8.9	32.3	46.0	B	9.0	23 8.3	4.8		9.2	30.2	38.1		9.5	39 4.7	51.8	
9.5	29.3	55.0		9.0	32.6	41.8		8.1	16.4	34.5	K	9.5	31.5	26.5		9.2	9.7	48.6	B
9.5	3 0.2	7.5		8.9	52.7	51.8	K	9.5	33.4	25.2		8.2	42.3	49.5	L	9.5	11.0	2.0	
9.5	20.2	11.0		9.5	12 12.4	27.6		8.5	49.5	20.3		9.5	42.8	30.0	B	8.7	40 21.0	53.3	
9.5	28.1	7.3		8.2	15.3	4.5	K	9.5	24 17.6	22.7		9.5	52.9	56.0		9.5	33.8	43.5	
9.1	31.2	46.1	K	9.5	34.7	27.9		8.9	20.9	54.7	B	9.4	59.4	7.9		9.3	52.2	46.3	
9.5	44.9	56.1		8.0	53.0	53.5	K	9.5	25.4	53.3		8.4	32 8.0	1.5	K	9.5	41 11.8	12.2	
9.0	58.1	12.8	K	9.5	13 9.6	4.9		9.5	26.9	15.1		8.9	21.3	40.4	L	9.4	11.9	7.0	
9.5	4 33.8	5.9		9.0	13.9	47.4	K	6.5	39.2	41.9	K	8.7	25.5	55.6		9.5	19.0	21.2	
9.1	5 0.3	59.6		9.5	15.3	27.4		8.0	56.0	25.2	K	9.5	44.7	20.3		9.5	23.2	9.9	B
9.5	2.1	11.4		8.3	20.5	54.6	K	9.0	25 22.5	22.7	K	9.5	57.0	1.0		8.8	24.0	12.2	B
9.2	8.8	30.2		8.6	25.5	30.9	B	9.0	56.4	22.1	K	9.4	33 19.7	39.0		8.8	35.0	51.5	
9.2	14.2	30.9		9.5	42.8	59.6		8.1	26 0.8	53.6	G	9.4	24.1	40.2	B	9.2	51.7	21.5	
8.9	21.5	44.7	K	9.4	14 7.1	10.5		8.5	3.4	40.9	K	9.4	27.8	41.4		9.5	42 15.7	41.4	
9.4	28.2	36.3		9.5	45.1	9.6		7.9	12.5	12.8	L	9.5	29.6	4.8		9.4	25.2	34.5	
9.4	29.0	28.9		9.1	15 31.4	21.3	K	8.0	22.7	32.7	K	9.0	33.7	31.0		9.5	46.4	2.5	
9.3	30.8	54.6		9.3	46.9	27.1		9.5	59.2	4.7	B	9.4	49.5	40.1		9.5	53.5	7.8	
9.5	42.3	54.3		8.7	56.7	49.7	K	8.3	27 24.5	15.2	L	9.5	50.2	48.1		9.0	43 33.9	14.0	
9.5	59.4	50.6		9.5	16 21.9	32.6		9.5	59.7	14.8		8.9	54.6	11.7		9.4	44.2	42.4	
6.8	6 5.4	8.9	K	9.5	17 27.7	55.2		9.1	28 11.9	43.3		8.9	59.0	58.6	K	9.3	44 2.3	38.6	B
9.2	28.6	2.5		9.0	42.4	9.3	K	9.0	26.0	50.6		9.4	34 14.5	3.7		9.5	18.4	27.0	
9.5	46.4	3.5		9.5	18 1.0	13.1		9.5	28.1	22.2		9.0	15.6	2.4	B	9.1	36.2	9.7	
9.5	57.9	21.7		9.3	19 27.9	34.0		9.5	41.3	18.2		8.8	46.0	7.3	K	9.5	45 11.4	46.7	
9.5	7 3.0	54.7		9.4	35.0	8.5		9.4	57.8	11.5		8.6	35 33.9	56.3	K	9.5	25.2	56.4	
9.5	19.8	13.5		9.4	41.7	54.8		9.2	29 2.0	42.7		9.0	42.3	39.7	B	7.3	33.6	35.3	L
9.4	28.6	47.5		9.2	48.3	2.2		9.3	6.3	9.2		9.4	59.9	29.7	B	7.5	46 7.2	30.1	L
9.5	28.9	32.0		9.5	48.9	6.5		9.5	7.6	54.3		9.5	36 2.0	32.4		9.4	25.8	6.2	
9.5	49.8	1.7		9.5	20 4.3	56.6		9.3	10.5	3.6		9.5	53.4	40.5		9.3	57.8	6.0	
9.5	8 3.4	28.6		9.3	7.4	3.6		8.2	23.0	21.8	K	8.3	37 3.7	39.8	K	8.8	47 15.7	38.4	
9.5	43.0	7.3		9.2	27.0	57.3		9.4	40.7	5.5		9.5	26.7	56.5		9.5	51.0	49.8	

201—260				261—320				321—380				381—440				441—500			
	0u—1u	+42°			1u	+42°			1u	+42°			1u	+42°			1u—2u	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	47 56.5	41.0		9.5	6 2.3	56.7		9.5	25 47.3	41.1		9.5	39 46.3	24.6		9.0	56 28.7	33.4	K
9.2	48 7.3	50.7	B	8.7	22.0	8.8	B	9.0	26 7.8	31.1		8.9	40 32.2	17.5		8.8	57 41.1	0.5	K
9.3	18.3	25.2		9.4	24.5	8.8	B	8.4	42.3	17.6		9.5	49.0	20.3		9.5	46.7	52.7	
9.2	23.0	30.0	K	9.5	26.4	19.3		9.5	46.0	5.2		9.5	59.9	57.9		8.6	48.6	22.7	
6.5	27.2	11.9	K	9.2	30.5	52.7	B	9.2	27 21.6	44.9		9.5	41 58.7	33.2		8.1	58 21.4	56.0	L
9.3	49 20.4	57.7		8.5	46.7	36.7	G	9.0	40.3	37.2	K	9.5	42 18.3	33.9		8.6	34.1	20.7	K
9.3	22.7	5.0		9.2	7 23.8	20.0		9.2	51.4	51.6	B	9.3	20.3	28.4	B	9.5	55.7	10.7	
9.5	38.2	10.4		8.6	28.0	22.7	B	9.3	52.4	13.7	K	7.8	20.4	48.3	B	7.8	58.9	27.7	L
8.9	50 15.3	3.6		9.3	32.5	46.6	B	9.3	53.0	32.8		8.9	36.0	45.3		7.5	59 27.7	31.2	K
9.4	30.1	10.7		9.5	44.7	50.1		8.9	28 21.3	3.1		8.4	40.5	3.2	K	9.0	40.1	43.5	
9.5	51 14.2	14.8		7.0	8 11.6	10.7	K	9.0	29 6.7	39.5		9.4	44 3.9	49.1		8.0	45.2	20.7	K
8.5	14.2	4.4	K	9.5	33.3	53.5		9.5	14.8	8.7		8.0	31.2	40.3		8.3	0 1.8	46.2	
9.5	45.3	10.3		9.5	9 19.1	6.9	B	8.5	18.6	55.6	K	9.0	47.2	33.8		8.8	27.2	17.0	K
9.0	48.2	42.9		8.6	50.8	3.2	L	8.8	36.8	39.8	K	9.0	59.7	13.2	B	9.4	27.9	55.8	
9.4	52 31.4	57.4		7.5	10 12.3	32.8	K	9.5	40.2	1.5		9.0	45 0.1	39.6		9.0	29.2	52.4	K
7.5	32.4	20.0	L	9.5	21.7	3.9		9.4	56.3	37.4		9.5	47.6	55.7		7.2	41.0	10.2	K
9.5	53 10.1	8.9		9.4	39.5	27.9	B	9.5	30 11.4	57.7		7.4	56.5	7.2	K	8.7	1 4.6	30.3	
9.2	15.5	3.9		9.1	54.3	33.3	K	9.5	57.7	9.2		9.3	47 1.0	39.2		9.1	19.7	56.2	K
9.5	18.6	52.5		8.9	59.9	36.5	K	9.5	31 11.6	55.3		7.5	10.9	21.2	L	9.5	42.1	28.6	
9.4	45.5	37.3		8.0	11 31.1	27.7	K	9.5	27.3	5.2		9.5	19.2	14.4		9.5	42.6	21.6	
9.5	54 6.7	24.9		6.5	54.3	45.0	G	9.0	32.2	0.4	K	8.8	31.5	8.7	K	9.5	45.1	29.2	
8.9	32.9	3.0	K	9.4	12 28.9	10.2		9.5	37.2	47.8		9.0	55.7	29.0		9.5	47.6	19.7	
9.5	48.7	47.7		9.2	31.7	46.4		9.5	58.6	50.3		9.5	48 10.6	41.4		9.1	51.2	56.0	
8.0	50.7	33.9	L	7.5	42.7	28.4	K	9.5	59.0	52.9		9.4	18.3	15.2		9.5	54.5	27.6	
9.5	55 0.3	7.7	B	9.5	43.8	43.3		6.0	59.7	33.8	K	9.3	23.1	4.9		9.5	2 2.7	2.0	
8.8	9.7	2.7	K	8.8	58.6	11.5		9.5	32 1.0	53.7		9.3	30.2	46.3		9.3	6.6	53.6	
9.5	16.7	5.9		9.5	13 18.3	21.0		9.5	42.6	6.5		9.4	52.1	0.8		9.5	26.8	34.5	
9.0	56 7.2	15.9	K	6.5	46.8	50.0	K	9.4	44.5	19.5		9.0	49 3.3	41.4		9.5	41.2	54.4	
8.5	9.8	33.8	K	8.5	14 3.5	54.1	K	9.4	46.8	32.5		8.0	31.3	54.5		9.5	53.0	46.0	
9.2	18.7	44.3		9.5	5.6	5.5		9.0	33 16.0	47.0	B	9.1	36.2	8.9		9.5	3 2.3	46.2	
9.5	36.2	52.1		8.4	15 29.2	2.9	K	9.0	16.8	7.7	K	9.5	49.2	19.7		9.5	16.1	5.6	
8.0	49.4	29.8	K	9.3	44.6	9.8		7.5	25.1	54.2	K	9.1	56.2	26.5		9.5	30.8	8.5	
8.3	52.5	33.9	K	6.5	53.7	23.2	K	9.4	32.2	48.5		9.2	50 10.0	34.8	B	9.5	54.1	26.6	B
9.2	57 4.5	52.8		9.5	16 10.8	25.1		8.6	34.5	16.6	K	9.2	17.6	0.3	K	9.5	54.7	58.2	
8.8	33.0	5.7		8.8	27.6	56.5	K	9.3	59.8	17.1		9.5	18.3	6.1		9.5	5 28.2	7.0	
9.5	58 21.3	22.8		9.3	28.3	17.3		8.8	34 35.3	58.6	K	8.6	22.9	16.6	K	9.5	37.2	3.9	
9.0	25.3	15.1	K	9.4	30.7	9.1		8.4	46.7	16.6		9.5	25.2	28.4		9.5	6 4.2	18.6	
9.5	59 3.0	26.5		9.5	43.0	58.1		9.4	35 11.2	10.0		9.3	28.7	17.5		9.3	27.9	43.1	K
7.5	6.2	45.3	K	8.7	43.7	32.5	K	9.4	14.8	19.9		8.9	35.4	59.3	K	9.5	54.9	57.5	
7.0	51.7	4.1	K	9.2	17 4.2	40.6		7.7	25.2	30.4	K	9.5	51 18.6	49.9		7.5	7 1.8	2.1	G
9.5	0 14.2	29.7		9.5	18.8	21.1		8.7	33.6	55.0	K	9.5	38.3	11.8		8.5	12.2	29.8	
9.5	31.9	54.1		6.0	49.4	41.2	G	7.7	36 22.3	58.7	K	9.4	51.1	19.0	B	8.3	24.9	22.7	
9.4	43.7	44.2		9.0	18 3.2	40.0		9.4	30.8	38.8		9.4	52 13.1	18.1		9.5	8 0.0	38.2	
9.0	53.7	30.0		8.4	10.9	3.8	K	8.4	40.2	43.0	K	8.5	27.9	56.7		9.5	2.0	33.9	
9.3	56.4	11.0		6.9	12.1	56.9	K	8.9	51.0	59.5	K	9.4	32.7	45.3		9.5	2.5	46.9	
9.0	1 12.5	53.2		9.5	39.5	0.9		9.5	58.7	8.4		9.3	34.3	38.0		9.5	7.2	19.2	
9.5	25.4	56.9		9.5	19 8.5	41.8		9.5	37 11.4	49.3		9.0	36.6	57.6		9.5	12.5	28.2	
9.5	2 15.8	10.9		7.7	51.5	2.4	K	9.5	12.6	25.0		9.0	37.4	25.4		9.5	52.9	18.1	
7.7	29.7	10.1	K	9.0	20 32.3	0.3		9.3	24.8	7.6	B	9.5	53 13.2	29.7		6.7	55.7	13.9	K
9.1	50.7	6.6	K	9.5	41.4	34.8		7.5	37.3	58.8	K	7.7	31.8	9.1	K	9.4	9 24.3	8.5	
9.5	3 13.0	6.8		9.4	21 56.8	46.4		8.9	48.3	51.2	B	8.8	36.2	48.9	K	8.9	55.9	16.4	K
8.0	31.0	59.1	K	9.5	22 16.9	21.5		9.4	53.0	46.2		9.5	54 3.1	0.5		9.5	56.5	21.0	
9.5	4 3.2	15.2		8.0	33.8	52.5	K	7.5	38 44.1	21.5	K	9.5	35.2	31.7		9.5	10 3.8	0.4	
9.5	22.0	0.1	B	9.5	35.7	3.8		9.5	39 12.4	3.9		9.4	52.4	39.9		9.2	16.7	59.0	F
9.5	37.2	23.8		9.0	23 34.1	57.7		9.0	13.1	29.5		9.5	55 2.7	8.3		9.5	19.4	44.5	
9.5	38.5	21.8		9.4	46.6	7.5		8.9	22.7	34.1	K	8.9	8.1	16.3	B	9.5	21.8	19.5	
9.5	45.5	56.0		9.5	48.8	26.7		9.5	24.4	1.4		9.5	8.4	30.0		9.5	45.7	52.[illegible]	
9.3	57.0	51.4		9.2	24 14.5	14.2	K	8.6	24.9	27.7	K	9.5	29.3	5.4		9.5	11 0.3	57.[illegible]	
9.0	5 40.2	41.1	K	8.9	43.4	35.1	K	9.3	28.2	8.1		9.5	48.2	53.1		9.0	15.3	20	
9.3	58.2	18.4	B	9.3	25 41.2	11.1	B	9.2	32.2	3.4	B	9.5	48.9	36.6		9.3	54.9	3[illegible]	

+42°

501—560				561—620				621—680				681—740				741—800			
	2u		+42°		2u		+42°		2u		+42°		2u—3u		+42°		3u		+42°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
8.7	11	57.1	6.1	K	8.5	29	32.2	40.4	L	9.3	36	13.2	8.7			8.3	52	7.4	7.1	K	8.9	10	23.0	2.1	
6.5		58.1	17.1	K	9.1		33.6	38.0	B	9.5		17.5	21.1	B		9.0		15.9	29.1		9.5		38.4	20.9	
9.5	12	8.2	27.6		8.1		37.2	36.3	L	9.4		36.7	38.5			8.8		19.8	43.2	K	9.4		52.1	55.4	
9.5		24.0	13.7		9.4	30	0.1	5.6		8.8		51.5	0.5			9.2		52.0	36.8	K	9.4	11	2.5	8.5	
8.2		58.8	54.8	K	8.5		4.2	10.9	K	9.5	37	2.5	13.1			9.1	53	28.5	12.0		9.4		10.3	43.4	
7.3	13	43.3	51.8	K	8.8		31.3	21.7		9.5		28.4	22.4			9.3		29.3	15.6		9.1		11.0	2.7	
8.0		48.7	45.6	K	9.3		45.1	29.9	B	9.2		55.0	56.8			9.5		58.7	36.1		9.5		18.9	57.4	
9.4		54.2	39.8		9.5		50.5	31.2		7.5		59.5	47.3	K		9.3	54	4.0	14.7		9.2		23.4	49.9	B
8.1	14	4.2	20.8		9.5		52.3	29.8		9.0	38	27.0	17.8			9.5		20.6	30.7	B	8.9		38.2	30.4	
9.5	15	9.7	40.3		9.3	31	4.1	26.2	B	9.3		53.6	21.4			9.4		35.6	57.2		5.4		45.6	48.4	K
9.4		11.0	21.9		9.5		31.0	5.6		9.5	39	4.8	3.7			9.5		39.9	58.4		9.1	12	5.1	27.0	
8.6		23.2	49.5		8.8		40.9	14.8		9.4		12.4	58.5			9.1	55	23.5	38.0		8.7		7.3	19.8	
9.4		33.9	7.5		9.0		44.4	16.8	B	8.8		19.2	7.5	B		8.6		29.5	36.3	K	9.4		12.5	57.7	
8.8		59.8	53.6		8.8		45.4	47.5	B	9.3		36.0	48.4			9.5		39.7	20.4		8.0		30.4	17.9	L
9.1	16	18.7	13.5		9.5		46.5	21.4		9.5		49.2	23.0			9.5	56	19.4	8.3		9.4		38.7	28.4	
8.9		34.0	5.1	K	9.0		48.1	48.5		9.5	40	31.6	19.0			8.5		26.9	56.5		9.5	14	9.8	0.4	
9.5	17	12.8	7.5		9.5		48.8	2.6		9.0		34.7	10.8	K		8.8		42.0	21.1		9.5		42.6	38.0	
9.2		21.5	31.6	K	8.7		53.9	3.2	K	8.0	41	12.0	41.6	K		9.0	57	3.8	41.5		9.5		43.5	23.7	
9.4		53.5	46.7		9.5		59.6	6.0		9.4		23.1	24.5			8.3		10.1	58.9		9.5	15	9.7	3.6	
9.2	18	14.1	59.4		9.3	32	2.7	15.6		9.5	42	19.8	15.3			8.0		13.6	2.5	K	9.5	16	3.1	54.8	
9.5		15.0	9.8		9.4		6.4	11.4		9.5		43.6	36.3			9.4		34.9	11.2		9.0		22.8	22.7	
9.4		51.0	38.7		9.3		7.7	13.1		9.5	43	5.1	6.5			8.6		40.5	32.5	K	8.9		22.9	4.7	K
8.5	19	9.3	35.6		9.4		19.3	15.3		9.2		12.0	10.0	K		9.1		42.5	43.5		9.4		27.2	12.0	
9.4		12.5	56.3		8.5		22.6	31.4		9.1		30.4	18.5			9.2	58	9.0	18.4		8.8		51.3	0.7	K
8.6		14.7	8.5		9.5		22.6	8.8		9.0		35.1	8.5	K		9.5		9.3	26.0		9.0		53.8	12.8	
9.2		41.8	45.2		8.2		29.8	8.8		6.8	44	47.9	0.5	K		9.1		33.5	53.6	K	9.5	17	26.6	12.8	
8.8	20	10.3	13.2		7.8		36.1	23.0	B	8.2	45	15.0	6.5	K		8.9		38.5	20.1	K	9.5		49.5	49.9	
9.5		12.5	56.4		8.0		38.4	9.8	K	9.5		15.0	18.3			9.4		46.5	58.1		8.9	19	16.1	47.2	K
9.3		15.0	13.7		8.0		40.3	9.9	K	9.5		16.6	56.7			9.4	59	13.7	32.9	B	9.3		20.2	56.6	
8.1		59.9	31.9	K	8.9		43.1	7.1		8.8		32.0	38.1	K		9.5		16.3	23.8		9.3		20.6	10.3	
9.5	21	12.0	21.0		8.0		48.2	5.2	K	8.6		39.2	8.1	K		9.5		36.5	16.0		8.6		45.3	43.9	K
9.3		13.0	31.1		9.5		50.4	7.5		9.3	46	2.1	18.2	B		9.5		54.7	48.8		7.5	20	40.1	29.6	G
9.4		31.2	16.2	B	9.0		53.0	12.5		9.5		31.5	40.3			9.5	0	8.0	3.0		9.2	21	6.3	57.4	
9.1		40.1	1.3		9.3		53.8	9.7		9.5		37.6	7.5	B		9.3		18.1	27.9	K	9.3		43.8	57.8	
9.5		43.0	11.4		8.7		54.9	7.3		9.0		40.5	43.0	K		9.4		18.1	22.4		9.5	22	23.0	37.5	
9.1		47.3	53.4		8.5		55.4	9.4		9.1		48.0	34.6			9.5		33.7	20.4		7.8		25.5	15.2	K
9.4		54.5	48.3		8.6		55.4	14.3		9.5	47	14.3	42.8			9.5		34.7	42.7		9.5		50.3	57.3	
9.3	22	31.5	56.1		8.0		56.3	4.4		9.0		35.5	20.8			8.8		49.0	14.3		9.5	23	9.3	4.4	
9.4		50.2	59.8		9.2		56.7	15.5		9.1		41.3	29.5			9.5	1	8.2	31.3		9.5		27.6	41.9	
9.4		51.2	56.8		9.3	33	2.0	35.4		9.2		55.5	19.4			9.0	2	15.7	18.5	K	9.5		39.1	24.1	
9.2	23	11.3	30.6		8.3		3.6	8.0		9.5	48	51.6	7.3			9.0		23.1	53.0	K	9.5		48.6	27.2	
9.0		19.7	5.0	K	8.6		8.6	7.8		9.3		56.2	30.9			9.5	3	23.5	1.7		9.5		56.2	12.8	
9.5		20.5	35.4		9.5		11.5	21.2		9.2		56.6	3.8	K		9.4		47.0	39.8		9.3	24	2.3	30.7	
9.5		36.6	36.7		9.4		16.0	17.7		9.4		58.5	47.2			9.5		56.2	41.2		9.4		50.0	11.9	
8.8		47.0	9.2	K	9.5		25.4	12.1		8.9		59.7	22.2	B		8.2	4	3.4	21.9	K	9.5		59.6	28.2	
7.0		58.5	15.5	K	9.0		25.6	35.4	B	9.3	49	6.5	5.4	K		9.4	5	25.6	1.6		8.7	25	29.8	5.2	
9.0	24	1.0	11.6	K	7.9		26.8	12.0	L	6.5		18.9	46.2	K		9.5		58.2	29.8		7.5		47.5	24.6	G
8.4		31.5	21.3	K	9.5		29.3	3.3		8.6		25.3	50.5	K		8.7	6	31.7	42.7	K	8.5		47.6	48.9	
9.4		33.0	13.9		9.5		37.3	11.3		9.5		30.8	14.1			9.5		41.3	14.3		8.3	26	5.0	24.2	K
7.7		54.2	8.9	L	8.3		41.4	23.3	B	9.3		38.7	18.7			9.5	7	1.7	34.8		9.4		47.1	3.4	
9.4	25	16.5	34.7		9.5	34	0.4	10.1		9.2		44.6	19.9			9.5		27.6	20.4		9.5	27	8.6	12.8	
9.0		21.1	47.2	B	9.1		5.9	9.1		9.1		57.2	17.9	B		9.5		28.9	26.4		8.0		12.5	47.4	K
9.5		26.1	44.4		8.8		11.7	35.6		9.1	50	30.8	19.6	B		9.5		40.9	22.4	B	9.1		35.6	39.5	
9.5	26	12.5	29.6		6.8		12.4	55.0	B	9.3		33.5	21.4			9.5		56.2	14.0		8.8		37.8	51.3	K
7.9		27.8	57.1	K	8.5		13.9	0.4	K	9.5		33.8	48.1			9.2		56.5	50.2	B	6.7	28	14.2	6.0	G
9.4	27	17.3	3.8		9.5		52.0	46.7		7.5		41.0	33.5	L		7.7		58.8	7.8	K	8.9		16.6	45.4	
8.8		43.2	26.6		9.3		55.0	40.7		9.2		57.7	14.5			9.5	9	30.7	10.5		8.6		23.5	59.9	K
9.5	28	19.5	26.1		9.5	35	2.1	34.7		9.5		57.8	2.2	B		8.6		39.8	4.7	K	9.5		43.0	18.8	
9.5		23.7	4.4		9.5		15.6	40.3		8.5	51	12.5	22.4	K		9.5		43.2	32.4		9.4		43.9	7.0	
9.3		34.3	51.2	K	9.5		23.5	54.8		9.5		24.0	15.5			9.2	10	16.9	55.6		9.5	29	0.3	24.1	

801—860				861—920				921—980				981—1040				1041—1100			
	3u	+42°			3u—4u	+42°			4u	+42°			4u	+42°			4u	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	29 2.3	14.8		9.4	49 53.4	59.9		8.0	3 56.9	12.4	B	9.5	20 59.7	7.1		9.3	35 48.0	51.3	B
8.8	3.2	38.5	K	9.4	50 29.2	14.2		9.5	4 9.0	54.7		9.4	21 0.8	50.9		9.5	50.4	35.1	
7.2	12.5	4.0	G	9.3	46.1	34.5		9.4	17.2	40.1		9.5	17.0	18.8		9.5	50.8	40.7	
9.5	30 12.8	43.9		9.5	51 49.6	30.2		9.5	25.0	29.8		9.5	22 1.4	42.5		9.2	57.7	14.9	
9.0	42.5	41.0		9.1	52 0.5	40.3	K	9.4	35.1	0.4		9.5	13.8	1.4		6.7	36 16.0	4.2	K
9.0	31 2.8	33.4		9.5	4.5	4.4		9.3	5 16.9	57.3		9.3	29.7	9.5	B	9.5	24.8	24.1	
8.9	34.6	1.9		9.2	20.7	43.9		9.0	17.8	46.9		9.5	39.2	13.8		9.5	36.9	58.4	
8.7	36.9	9.6	K	9.5	33.9	30.4		9.3	28.0	42.5		9.4	46.1	6.3		8.0	38.0	43.6	K
9.2	32 47.0	40.0		9.5	51.4	1.7		9.5	6 22.1	18.5		7.0	23 10.0	43.1	K	9.5	37 18.5	47.5	
7.8	33 39.1	42.9	K	9.0	57.6	24.1		9.3	27.2	34.0		6.5	13.2	44.8	K	8.5	19.3	3.1	K
9.1	41.3	3.4		8.7	53 6.2	22.5		9.5	48.6	26.9		9.5	20.0	13.2		9.5	22.5	46.8	
7.5	53.5	8.3	K	9.4	10.8	53.5	B	9.5	7 14.3	28.8		9.5	49.0	35.4		9.5	26.5	45.5	
9.2	34 22.3	41.0	K	9.3	29.7	57.7	B	9.5	19.7	0.9		7.7	53.2	46.4	K	9.5	40.8	25.5	
9.0	23.9	0.3		9.5	32.5	17.2		9.5	44.1	16.2		9.0	53.5	29.2		9.5	40.9	20.0	
4.1	35 22.5	7.6	K	9.5	34.0	50.0		9.3	57.8	21.9		8.4	24 12.9	21.6		8.5	54.3	12.0	K
9.5	25.0	33.0		9.1	37.6	21.5		9.0	8 33.5	58.3		9.5	14.8	28.6		8.6	57.7	32.2	B
9.3	58.8	42.4		8.7	55.2	58.3	K	9.5	9 4.0	22.8		9.4	16.3	4.1		9.5	38 9.3	33.6	
9.5	36 34.6	49.9		7.8	54 8.7	7.2	K	7.1	11.7	1.5	K	9.5	38.9	36.0		9.1	22.0	53.9	
9.5	35.8	59.8		8.0	13.4	38.0	B	7.5	10 24.6	53.4	L	9.5	57.5	48.0		8.4	25.5	19.8	B
9.5	53.4	3.4		8.8	17.8	46.7		8.3	40.0	39.4		9.1	25 5.4	46.8		9.5	39 3.4	21.1	
9.5	37 10.0	17.3		9.3	46.1	1.0	B	9.5	11 5.1	5.6		9.5	18.9	29.7		9.5	25.1	4.3	
9.4	42.6	32.9	B	9.4	55 2.1	48.0		9.3	12 6.2	10.6		9.4	38.8	13.8		9.4	31.6	4.1	
8.9	38 26.5	55.7		9.5	15.0	14.1		9.0	36.2	1.4		8.0	48.9	31.9	K	8.6	35.5	18.2	K
7.8	30.0	25.2	L	9.0	29.5	55.6		9.5	50.7	10.9		9.2	26 36.0	21.0		8.6	36.1	1.8	
9.5	46.3	10.5		8.7	45.3	54.5	K	9.4	13 16.0	17.8		8.5	45.4	20.3		9.5	57.6	52.0	
9.5	39 23.4	33.0		8.5	52.4	45.5	K	6.5	31.8	4.7	K	9.0	48.3	35.0	K	9.2	40 33.0	27.0	
9.5	35.6	50.0		9.4	55.7	27.3		9.2	33.1	7.5	K	9.0	27 7.2	21.8		9.0	33.5	4.5	
9.2	57.0	46.5	B	9.3	56 34.2	52.6		9.4	40.4	46.3		7.9	14.0	43.4	K	8.9	38.8	44.2	B
9.5	40 2.5	13.5		9.0	44.6	49.1	K	9.5	49.1	30.7		8.9	16.3	57.6	K	9.5	41 0.4	13.7	
9.5	35.3	59.9		9.5	57.5	27.5		9.3	50.6	25.5		9.4	25.0	10.8		9.5	36.0	8.6	
8.0	35.8	9.0	K	9.5	57 0.7	16.3		9.4	54.7	27.6	B	9.5	32.0	5.5		9.0	44.1	22.2	
9.5	41 31.6	48.0		9.4	5.2	53.6		8.5	14 13.8	19.3		9.3	56.7	21.4		8.9	45.6	1.1	K
8.0	38.5	10.3	K	8.2	21.5	53.3	K	9.5	21.6	25.9		9.0	28 0.8	20.6	B	9.3	54.3	29.0	
9.5	50.1	14.8		8.6	25.3	27.9	B	8.7	29.2	22.5		9.5	11.5	7.3		9.5	56.8	44.8	
9.5	43 14.7	10.7		8.8	52.8	39.6	K	8.9	46.8	1.5	K	8.1	12.1	40.4		9.1	42 0.2	57.0	
9.5	58.2	10.7		6.7	57.5	47.5	K	9.5	49.8	11.0		9.5	25.6	48.4		9.5	4.5	17.1	
9.5	44 13.7	52.8		6.5	58 9.0	48.0	K	9.5	53.3	41.5		9.2	25.9	56.0		9.5	8.6	8.1	
9.3	26.4	1.1		9.3	14.4	1.1		9.5	15 12.2	33.5		9.5	38.8	47.8		9.4	13.4	40.7	
9.5	29.3	57.3		9.5	34.5	1.6		9.5	51.1	55.4		9.3	43.0	44.6		9.5	18.0	46.9	
8.7	36.3	6.6	B	9.5	40.7	43.9		8.0	58.0	18.3	K	9.5	46.8	28.9		9.3	21.0	28.4	
9.5	52.5	22.7		9.5	45.2	36.5		9.5	16 33.0	0.4		8.6	29 46.8	7.8	K	6.2	34.5	20.0	K
9.5	56.8	48.7	B	9.0	59 29.5	7.1	B	9.5	35.0	47.5		8.6	50.4	58.0	K	9.5	43.5	10.3	
9.5	45 2.2	1.6	B	9.4	57.2	16.0		8.5	38.2	48.2	B	8.5	58.0	2.6	K	8.8	52.8	41.2	K
9.5	2.3	53.3		8.3	58.4	11.9	K	8.0	40.0	34.9	K	9.5	30 2.3	13.6		8.7	43 4.9	57.0	K
8.5	14.1	27.8		9.5	0 24.9	38.9		9.5	47.7	53.1		9.0	17.6	13.8		9.4	56.6	24.0	
9.5	17.6	39.5		9.5	30.9	46.5		9.5	17 12.3	33.9		9.5	27.4	51.0		9.5	58.7	50.2	
9.5	23.5	49.7		9.4	31.0	57.5		9.2	25.1	36.6		9.4	33.2	57.9		9.5	44 4.8	42.4	
9.5	27.8	58.8		9.4	34.1	39.9	B	9.5	27.7	38.8		9.5	42.5	44.7		9.5	26.2	17.5	
9.5	44.3	54.9		9.3	36.4	30.2		7.2	33.1	51.4	K	9.5	32 3.0	37.6		9.4	38.9	51.0	
9.5	46 12.3	31.1		9.0	41.5	59.3		9.4	40.5	2.7		9.5	33 26.1	22.4		9.5	43.1	0.5	
9.2	17.6	9.3		9.5	1 0.6	32.4		9.5	18 9.1	51.2		9.5	33.7	9.6		7.9	44.6	41.0	K
8.9	27.8	34.7	K	9.5	20.5	17.2		9.5	48.6	46.1		8.9	44.2	53.2	K	9.5	45 5.2	10.5	
9.0	30.7	4.0		8.6	50.4	22.3		7.0	54.0	23.2	L	7.5	51.8	8.5	K	8.5	12.4	25.4	
8.3	46.0	49.0	K	9.5	57.5	34.9		9.3	19 20.2	15.4		8.5	34 29.7	55.5	K	9.5	22.5	18.0	
7.4	47 26.7	53.7	K	9.5	2 14.9	53.0		9.5	20 6.5	31.6		9.4	37.3	15.6	B	9.4	24.8	52.[illegible]	
8.5	48 16.5	41.0	K	8.2	16.9	31.7	B	9.5	11.4	15.3		9.5	41.2	19.6		9.2	31.3		
9.5	54.0	42.9		9.0	49.8	29.6	K	9.1	15.5	58.6	K	9.5	35 5.4	10.3		8.1	34.		
9.4	56.2	3.6		9.5	53.7	40.0		9.5	29.2	23.1		9.1	21.2	51.6		9.1	46 1		
8.8	49 21.4	56.0	K	9.5	59.8	17.2		8.5	36.9	27.0		9.0	35.7	51.2	K	9.5			
8.6	23.8	55.3	K	9.4	3 45.4	10.6		9.5	53.3	54.2		9.5	41.8	9.0		8.2			

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	4ʰ	+42°			4ʰ—5ʰ	+42°			5ʰ	+42°			5ʰ	+42°			5ʰ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.7	46 41.2	57.2		9.4	55 9.9	42.3	B	8.0	5 12.9	21.5	K	8.9	15 33.0	51.1	K	9.4	25 47.8	4.8	
9.5	57.6	54.7		9.5	10.0	35.1		9.5	16.3	58.2		9.1	34.1	14.9		9.2	26 10.2	4.9	K
9.5	47 6.8	48.8		9.0	26.4	24.0		8.7	22.8	13.5	K	9.5	50.6	2.9		9.2	14.4	15.3	
9.5	25.1	2.7		8.4	43.0	37.9	K	9.5	34.1	9.1		9.5	16 2.4	33.8		9.0	16.6	45.3	
9.5	27.4	24.7		9.5	43.7	43.2		9.4	46.2	27.2		9.3	12.8	32.3		8.4	17.5	25.2	K
9.4	28.2	50.5		9.5	43.8	56.2		9.5	46.8	9.9		9.4	12.9	53.2		9.5	36.0	18.4	
9.5	33.3	32.2		9.5	53.5	9.6		7.4	52.8	35.7	K	9.4	48.1	40.0		9.0	42.1	18.2	K
9.4	44.8	12.9		9.3	56 0.3	15.3		7.9	6 13.1	29.2	K	9.0	57.0	9.9	K	9.3	27 2.4	13.9	B
9.5	46.0	56.1	B	9.5	15.3	52.7		9.5	29.0	36.3		9.5	17 7.6	45.5		9.5	9.7	45.2	
9.2	48.6	2.6		6.8	29.5	58.5	K	9.5	32.2	33.2		9.0	14.1	25.6	K	9.5	15.0	57.2	
9.4	48 10.0	12.1		9.1	40.2	23.1		8.0	34.0	30.4	K	8.2	35.8	12.8	K	9.0	24.1	56.0	
9.1	22.9	17.9	B	9.5	45.0	30.8		9.0	40.4	4.8		8.8	46.6	45.7		9.1	42.0	52.4	K
8.3	25.4	25.3	K	9.5	57 3.1	6.2		9.5	53.2	46.2		9.5	55.5	55.7		9.3	57.9	1.3	
9.5	27.0	15.4		9.5	25.7	47.5		9.5	59.7	18.9		9.5	57.8	7.4		8.4	28 0.4	55.1	K
9.4	27.2	16.1		9.5	38.0	5.1		9.5	7 6.2	59.6		9.3	18 19.5	18.5		8.2	28.5	18.4	B
9.3	32.6	22.4		8.4	56.2	42.4		9.1	8.5	4.2		9.5	25.6	57.0		8.5	30.0	51.3	K
9.5	33.0	43.6		9.5	58 11.3	3.9		9.4	16.3	48.3		9.5	26.4	18.6		9.0	31.3	57.5	B
9.4	39.7	24.3		9.4	12.6	26.8		9.4	36.0	58.0		6.9	41.5	8.9	K	9.3	33.3	7.9	
8.5	46.4	18.8	K	8.5	22.4	45.6		6.0	55.4	37.9	K	9.5	59.0	59.2		9.5	38.5	18.2	
9.5	49 12.9	24.0		8.8	30.3	23.0	B	9.0	8 14.0	38.0	B	8.5	19 2.4	6.5	K	9.4	57.3	55.4	
9.5	18.0	24.9		8.8	49.6	49.4		9.5	16.7	36.3		9.0	14.1	2.7	K	9.2	59.0	32.1	
9.4	40.6	59.6		8.8	59 15.1	57.4	K	9.5	31.9	14.5		9.4	17.8	12.1		7.4	29 3.1	35.0	L
9.3	50 33.4	12.3		9.5	23.6	32.5		9.5	53.8	18.0		9.3	22.7	52.0		9.5	12.3	52.9	
9.1	43.3	13.5		8.0	30.0	29.1	K	9.5	9 35.6	23.4		9.0	34.6	30.0	K	9.4	26.0	28.4	
9.5	58.7	53.6		9.4	33.8	18.4		9.0	52.4	55.6	K	9.0	35.0	5.8	K	9.5	40.7	54.3	
9.5	51 12.8	6.5		9.5	42.3	23.5		9.0	59.5	20.9		9.5	38.7	40.7		8.9	45.1	59.1	K
9.5	23.7	17.9		9.2	45.6	3.6		9.4	10 11.9	58.9		9.1	20 17.4	37.8	K	9.4	59.7	25.6	
7.7	29.4	7.6	K	9.3	46.2	9.7		9.2	12.3	41.8		8.3	43.6	48.0	K	9.2	30 3.6	41.5	
9.0	31.6	31.0		9.5	0 15.8	13.1		9.1	14.8	8.7		8.8	21 9.6	44.3	K	9.4	3.6	8.8	
9.5	35.3	55.7		8.7	35.7	45.6		9.0	17.2	9.5	B	9.2	13.1	58.5		8.9	13.4	26.9	K
9.2	36.9	22.9	K	9.5	36.7	46.0		8.9	30.4	43.3		9.3	35.9	52.5		9.2	20.8	14.9	K
9.5	45.7	37.4		8.8	49.5	42.3		7.8	36.0	12.6	B	8.0	38.3	22.7	L	9.4	20.9	7.1	
9.5	52.7	13.7		7.9	1 10.6	33.2		7.1	44.8	21.0	B	9.4	47.4	44.8		9.1	26.8	22.9	K
9.5	52 0.2	22.1		9.4	13.8	54.6		9.1	45.0	11.2		8.7	50.3	51.3	B	8.5	31 2.5	16.2	K
9.4	7.1	15.8		9.5	22.9	19.2		7.4	48.7	12.7	B	9.5	51.6	23.0		9.5	29.9	5.0	
9.4	12.0	53.3		9.5	25.7	2.3		9.5	11 2.0	28.4		9.5	54.6	47.7		7.5	54.5	58.5	K
9.2	19.7	42.4		7.9	46.4	12.7	G	9.5	12.6	4.7		7.5	58.4	17.9	L	9.5	32 30.9	52.5	
9.5	19.9	20.6		9.5	55.7	16.7		7.0	39.0	8.1	B	9.4	22 2.2	45.5		9.5	50.4	42.9	
9.4	21.0	5.2		9.3	2 7.2	37.3		9.0	44.2	34.2		9.5	7.3	45.5		9.1	33 8.2	14.5	
8.9	22.1	50.6	B	9.3	14.9	46.8		9.4	51.2	6.1	B	9.5	17.3	27.8		9.5	9.1	45.9	
9.0	24.1	17.2	B	9.0	19.4	39.9	B	9.5	12 1.9	10.7		9.4	17.8	17.7		9.5	14.5	51.7	
8.0	41.4	21.2	K	9.3	26.5	9.1		9.5	8.4	50.2		9.5	19.6	0.7		9.5	17.2	7.2	
9.1	43.0	11.8		9.3	32.0	35.0		9.5	15.3	18.3		8.3	23.8	51.2	K	9.5	52.7	10.2	
8.6	56.4	10.6	B	9.3	33.1	30.3		8.8	18.3	29.8		9.0	24.6	48.3	K	9.4	34 33.0	11.0	
8.7	53 2.9	20.5	K	9.2	33.9	43.0		9.4	30.5	17.1		9.3	45.9	35.2		9.5	49.1	56.0	
9.5	5.4	12.5		9.4	3 16.3	33.9		8.6	36.5	48.2		9.5	46.8	11.5		9.0	35 3.9	38.8	K
9.4	8.4	12.4		9.5	28.8	55.7		9.3	49.4	19.3		9.3	48.5	32.4		8.0	11.7	47.4	K
9.5	20.7	8.4		9.5	39.4	19.1		9.3	51.8	43.7		9.5	48.7	12.7		9.5	21.5	57.4	
9.5	51.4	41.1		9.4	40.3	46.5	B	9.5	13 3.3	24.5		9.5	23 10.3	15.3		9.3	37.6	7.9	K
9.2	53.9	51.0	K	9.5	4 2.3	38.3	B	9.5	20.9	45.4		9.5	38.1	26.3		8.6	45.0	52.8	K
9.1	54 0.5	6.6		9.5	5.3	45.0		9.5	51.4	55.5		9.2	41.0	32.8		9.1	36 5.2	30.4	
8.7	7.4	42.6	K	8.0	22.8	14.5	K	9.3	54.6	37.9		9.5	48.8	6.9		8.7	11.0	0.8	K
9.4	16.9	19.4		9.1	35.3	18.8		8.5	58.8	27.8	K	9.0	50.2	16.7		9.4	28.8	46.6	
9.0	22.0	54.1	K	9.5	37.3	9.3		8.0	14 1.8	28.3	K	8.4	24 4.7	20.0	B	9.5	36.4	7.1	
9.5	33.8	31.4		7.9	43.5	18.0	K	9.5	38.4	43.4		9.5	27.2	2.5		9.5	40.1	41.6	
9.5	35.5	13.7		9.5	43.6	0.0		9.5	55.5	56.4		8.9	33.0	42.2		6.8	52.9	27.8	K
9.5	41.8	4.0		9.5	48.7	57.7		9.5	57.6	19.1		8.7	25 1.7	12.1	K	9.5	37 18.9	53.2	
9.0	48.7	29.1		9.4	54.7	53.6		9.4	15 2.5	58.4		9.5	2.4	30.2		9.5	34.8	11.2	
9.0	58.0	5.9		9.0	59.9	31.6		9.4	12.2	47.5	B	9.4	19.8	21.3		8.7	37.1	45.1	K
9.5	55 0.8	50.7		8.5	5 1.1	44.8		9.3	14.6	14.9		9.2	46.0	0.7	K	9.5	45.8	18.9	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	5ᵘ	+42°			5ᵘ—6ᵘ	+42°			6ᵘ	+42°			6ᵘ	+42°			6ᵘ—7ᵘ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	37 51.3	34.6	B	9.2	50 4.9	22.8		9.5	7 31.7	7.2		8.5	27 57.8	8.2		9.4	52 24.7	22.0	
9.4	53.3	37.8		9.2	13.0	21.9	K	9.3	34.2	44.9	B	9.1	28 7.8	36.9		8.5	25.8	45.3	K
9.4	56.2	38.7		8.2	13.4	43.5	K	9.5	43.9	35.0		9.3	20.3	31.9		9.4	28.3	29.0	B
8.5	38 1.0	0.3	B	9.5	51 1.8	21.5		9.5	52.3	26.1		9.5	22.8	14.6		9.5	49.9	12.6	
9.1	4.3	34.6	B	9.5	24.9	26.5		9.3	54.6	20.1		4.8	59.5	36.9	G	9.4	55.7	2.7	B
9.5	12.5	28.3		8.5	51.3	9.6	K	9.5	59.5	47.8		8.2	29 3.4	6.9	K	9.4	53 3.2	14.1	K
9.5	29.1	51.1		9.5	52 0.4	55.1		8.4	8 0.8	23.5	K	9.1	33.0	21.2	K	9.0	15.1	26.0	R
9.0	47.0	57.9	K	9.5	7.9	56.8	B	9.4	2.0	27.2		9.1	39.0	22.0		8.8	39.2	26.0	R
9.5	39 1.5	15.4		8.3	13.5	52.5	L	9.5	30.1	3.5		8.8	41.3	40.8		9.4	53.8	49.6	B
9.5	28.0	59.1		9.0	37.4	42.9		8.8	36.0	30.1		9.1	30 4.9	31.9	K	9.4	54 35.0	15.0	
9.5	29.8	37.8		9.1	50.5	39.4	K	9.0	54.5	3.5	K	8.9	30.2	11.2	K	8.5	52.8	5.1	K
9.4	32.1	38.0		9.1	51.8	42.5	K	9.4	9 22.2	28.0		9.2	31 52.3	58.8	K	9.5	55 10.2	32.9	
9.5	43.2	1.7		6.4	53.0	54.6	G	7.4	51.6	50.8	K	9.3	33 21.2	44.8	K	9.5	25.4	48.8	
9.5	40 4.9	18.7		8.6	58.0	11.8	K	9.3	10 16.1	51.0		8.8	34 21.8	32.4		8.7	33.3	39.9	K
8.5	12.0	55.7		9.4	53 13.5	1.0		9.5	28.5	43.3		8.7	23.7	39.7		9.3	37.7	20.6	K
9.3	21.7	39.8		9.2	26.2	21.1	K	6.5	57.0	23.6	K	9.5	35 8.2	17.6		9.5	48.1	6.0	
9.5	25.8	7.4		6.8	54 37.9	59.2	B	9.4	11 16.1	44.3		9.4	28.0	18.6		9.5	56 46.0	16.1	
8.5	41 0.2	3.3	K	9.4	50.6	1.3		9.5	29.4	2.3		9.4	28.1	1.6		8.3	50.0	10.7	K
9.5	12.1	50.3		9.5	55 32.0	19.1		8.5	36.6	53.9		9.5	49.2	39.4		9.0	57 20.0	56.4	K
9.3	36.6	58.7		9.4	43.0	45.0		9.5	12 25.7	13.4		7.0	52.1	23.5	K	9.5	26.2	30.9	
9.5	37.8	19.0		8.6	52.0	46.5		9.5	26.5	21.0		8.2	52.2	10.3	L	9.5	44.6	50.8	B
9.3	42 0.8	47.2		9.0	56.2	30.1		9.5	31.3	11.9		8.4	36 34.9	10.5	L	9.1	55.8	9.1	
8.4	2.6	12.9		9.2	56 2.2	0.5		7.7	32.1	58.2	K	9.5	38 45.9	8.6		8.5	58.9	42.8	
9.2	6.8	35.8		9.0	44.1	20.3		9.5	37.8	2.4		9.3	39 51.3	23.5		9.5	58 41.1	4.5	B
9.5	19.2	20.0		9.3	54.5	30.2		9.4	13 24.0	58.4		9.4	52.8	56.5		9.1	46.7	44.3	
9.4	25.1	2.3		6.8	57 27.7	40.9	K	9.0	14 1.0	15.2		9.4	40 2.0	59.0	B	9.5	59 10.5	0.5	
9.0	35.2	58.1	K	9.5	43.8	53.8		8.0	36.9	37.0	K	9.4	3.7	23.5		9.2	0 31.0	23.5	K
9.4	41.2	50.3		8.4	50.3	51.8	L	9.4	54.0	28.0		9.5	33.5	23.0		9.5	49.3	20.9	
9.2	43 4.7	46.6	B	9.5	55.4	58.9		9.5	15 46.5	33.5		9.3	47.7	52.1		9.4	1 31.1	9.8	
9.5	7.3	0.8		9.3	58 6.1	33.7	B	9.5	53.5	34.0		9.3	41 31.6	1.2		9.4	35.2	6.5	
8.9	20.9	0.0	K	9.2	26.0	42.8	K	9.2	58.7	6.5		9.3	47.4	3.9		9.4	46.7	21.0	
9.2	31.4	28.9		9.4	39.9	4.3		7.0	16 3.1	1.9	K	9.5	42 10.2	11.2		9.5	48.8	10.5	
8.4	42.2	31.8		8.5	59 0.0	25.2		9.5	17 37.0	57.2		7.8	15.1	46.8	K	9.4	2 13.2	34.9	R
8.7	44 19.4	18.9	K	9.1	13.4	58.6	K	9.5	57.0	39.0		9.2	21.1	1.5	K	9.5	32.2	26.5	
9.5	24.7	6.6		9.5	24.1	9.4		9.4	18 1.2	11.3		8.6	34.9	34.4	K	9.5	36.8	11.4	
9.4	35.5	38.7		9.5	29.0	21.7		9.5	42.5	5.5		9.5	35.2	55.0		9.1	47.0	13.3	
8.7	41.1	25.7	K	9.4	41.5	24.6		9.4	42.6	7.5	B	9.1	48.2	12.1	K	9.5	3 1.8	53.2	
9.5	52.4	18.7	B	9.0	0 24.3	48.9		9.0	43.0	44.4	K	9.5	44 13.4	49.3		8.4	54.2	47.3	K
9.5	54.3	51.7		9.0	38.9	3.1	K	9.1	54.6	31.0	K	9.5	48.3	20.1		9.4	54.4	16.0	R
8.2	45 31.3	29.1	K	9.5	54.6	20.8		9.4	19 59.1	21.5	K	9.3	45 18.7	12.1	K	9.1	4 26.7	2.1	K
9.4	39.2	29.5		9.1	1 13.6	6.5	B	8.5	20 31.5	52.5	K	8.5	38.9	4.9		9.5	34.8	29.5	
9.0	46 9.5	48.5	K	7.9	14.5	12.0	K	9.5	38.6	58.4		9.5	46 18.5	33.4		8.8	49.9	18.1	R
9.5	12.0	59.4		8.9	17.3	6.5	B	9.5	53.8	41.3		9.0	20.3	56.7	K	9.4	54.2	5.8	
9.4	44.2	31.4		9.3	2 8.5	47.4	K	9.2	57.2	9.6		9.1	33.0	44.1	B	9.5	5 18.0	1.0	
9.4	50.4	48.6		9.5	3 1.5	26.5		9.0	21 13.7	42.3	K	8.3	52.4	8.2	K	8.0	28.8	19.6	K
8.9	58.4	28.8		9.1	11.0	58.3	K	8.6	22 25.7	3.2	K	9.4	47 30.7	22.0	R	9.1	40.2	22.5	K
9.1	47 9.5	36.6		9.4	46.4	53.0	B	9.5	30.8	23.5		8.8	35.0	40.0	B	7.7	43.0	10.7	K
9.4	32.3	41.9		9.4	54.1	14.5		9.3	23 40.9	12.6	K	9.0	49.7	24.0	R	9.3	6 48.6	4.0	
9.5	36.8	54.5		8.8	4 3.9	50.3	K	9.5	41.8	22.0		6.5	49 2.7	29.0	K	9.5	7 11.8	32.9	
8.0	42.9	49.1	K	8.0	35.2	10.0	K	9.1	57.6	55.9	K	9.3	2.7	57.0		8.3	39.5	2.7	K
9.1	48 6.5	59.9		9.2	45.8	6.0		9.3	24 22.9	36.5	B	8.5	25.1	4.6	K	9.2	53.2	27.0	
9.2	23.4	13.3		8.6	58.2	11.0	K	9.4	29.4	8.7		7.6	42.7	3.7	K	8.0	8 19.8	7.1	K
9.4	41.5	17.5		9.0	5 24.1	29.1		9.5	34.0	32.3	B	7.7	46.2	22.0	L	8.8	25.7	18.1	
9.4	49 21.5	2.4		8.1	31.0	4.6	K	9.3	41.5	20.1	R	8.6	49.3	42.3	K	9.1	25.7	32.4	
9.0	23.2	6.6	K	9.0	32.5	29.7		9.5	42.8	45.8		8.5	50 3.2	25.5		9.5	49.5	55.	
9.4	30.3	7.2		9.4	45.8	8.2		9.3	56.5	8.9		7.8	14.7	16.1	K	9.5	9 19.0		
9.5	30.4	28.7		9.2	6 19.1	44.3	K	8.0	25 37.5	42.8	L	9.5	37.2	39.3		9.5	33.0		
9.5	33.6	4.8		9.2	55.0	11.2		8.5	37.9	2.2	K	9.3	51 3.6	1.2		9.5	42.8		
9.2	49.4	32.2	K	9.4	7 13.6	28.5		9.5	26 47.3	36.4		8.1	52 4.3	3.2	B	6.5	10 49.2		
9.3	59.5	28.5		9.2	31.3	34.7		9.1	58.4	33.4	K	9.5	10.0	32.0		9.4	53.		

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	7ᵘ	+42°			7ᵘ—8ᵘ	+42°			8ᵘ	+42°			8ᵘ	+42°			8ᵘ—9ᵘ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	11 44.9	1.6		9.5	36 13.9	5.5		9.5	0 32.0	10.7		9.5	21 33.8	34.6		9.5	44 44.6	56.7	
9.4	58.1	22.2	B	9.4	42.6	27.3		9.5	50.4	13.0		9.1	36.2	18.9	K	8.7	45 30.3	56.0	
9.0	12 18.2	43.8		8.9	59.5	18.4		9.5	1 5.0	15.5		9.1	47.2	24.3	K	9.2	52.2	34.9	
7.7	31.0	56.5	G	8.5	37 12.5	24.3	K	9.1	34.2	26.2		9.5	22 6.3	32.5		7.0	46 8.0	13.5	K
9.3	43.2	3.8		9.5	16.1	8.8		9.4	34.6	41.9		9.5	34.3	15.0		9.5	23.0	25.2	
9.5	50.2	11.0		9.5	49.0	2.3		9.5	2 22.4	43.5		7.7	57.0	37.2	K	8.9	40.4	42.7	K
8.6	13 28.7	34.9	K	9.5	53.0	10.0		9.5	45.1	58.4		9.4	23 4.0	0.0		8.9	47 48.5	11.2	
9.5	44.5	6.1		9.3	38 47.1	4.1		9.3	3 10.9	47.5		9.2	4.6	13.8		8.8	51.3	57.0	K
9.5	57.3	42.3		9.1	59.8	32.8		9.5	24.6	9.5		9.2	7.8	57.2		8.9	48 25.4	12.2	K
9.5	14 3.8	35.9		9.5	39 12.6	49.2		9.4	46.8	52.7		9.0	14.6	23.4		9.4	41.3	23.6	
9.3	18.8	40.8	K	9.4	59.7	48.0		9.1	4 0.1	2.6	K	8.6	18.7	17.2	K	9.2	49 19.7	8.5	
7.8	38.7	15.1	R	9.4	40 36.9	51.5	B	9.1	38.0	2.0	K	8.3	28.8	28.9	K	9.4	23.9	22.5	
8.5	15 9.3	57.7	K	9.5	57.0	52.0		9.5	5 1.6	43.8		7.6	36.9	15.0	K	9.3	50 15.3	20.6	
8.0	47.5	1.7	K	9.4	42 19.1	35.5		9.1	38.1	21.5		9.5	24 0.0	36.0		8.6	29.9	55.9	K
7.6	50.2	25.9	K	8.9	43 0.8	19.4		9.5	6 18.4	33.4		9.1	20.5	53.6	K	9.5	51 6.8	18.9	B
9.5	17 2.3	21.4		9.5	36.6	49.8		9.5	54.2	25.4		8.9	25 20.1	13.9	K	4.1	13.6	21.3	K
9.0	18 24.5	14.1		8.4	52.0	47.2	K	8.8	7 8.1	22.4	K	9.0	31.0	50.8	K	9.0	18.7	45.5	
9.3	45.4	11.0		9.4	59.8	35.6	B	9.5	26.4	47.6		9.5	36.5	39.3		9.4	44.6	28.4	B
9.1	19 1.0	0.1	K	9.4	44 12.3	51.1		9.4	8 20.1	10.4		8.5	47.8	15.5	K	9.4	48.2	28.1	
8.5	49.8	22.5	K	7.5	37.0	9.9	L	9.5	48.9	38.6		9.4	26 36.3	6.4		9.2	52 57.7	57.8	K
8.5	59.2	42.8		8.5	39.3	58.3	K	9.3	9 25.8	26.0		9.5	27 16.7	56.4		9.5	53 48.2	24.7	
7.0	20 30.8	11.3	K	7.8	45 5.5	21.3	L	9.5	35.7	32.6		8.7	23.8	17.0	K	9.4	54 12.8	32.9	B
9.5	34.2	44.8		9.0	14.5	5.9		8.8	41.9	38.3		8.6	56.8	17.9	K	9.3	55 12.4	42.0	
9.5	57.1	31.7		9.5	46 22.5	51.4	B	9.5	10 0.8	10.0		9.0	28 5.7	47.0		9.3	54.1	28.7	
7.3	21 26.7	55.7	K	9.5	42.8	50.9		9.5	37.6	21.3		9.3	28.4	11.2		8.6	56 51.4	16.9	K
9.2	43.5	39.1	B	9.4	52.8	20.2	B	9.5	49.2	39.8		9.4	29 19.2	11.3		9.5	57 13.3	11.2	
9.1	22 2.2	24.2		9.5	47 55.2	21.2		8.3	55.2	32.8		9.5	25.3	8.8		9.5	44.0	55.2	
9.5	14.0	3.7		9.3	48 24.2	19.6	B	9.1	11 13.7	38.8		9.4	30 25.9	42.9		9.5	58 5.4	51.3	B
9.1	23 6.2	25.3	B	9.3	49 19.5	26.8		9.4	37.5	0.0		8.8	31 4.7	18.0	K	8.5	51.2	45.8	K
9.3	26.8	13.0		8.5	21.5	10.4	K	9.1	39.8	59.5	K	8.7	9.4	56.1	K	9.0	59 8.6	37.7	
7.5	33.1	40.5	K	8.8	22.1	41.2		9.3	12 43.3	30.6		8.9	32 18.7	48.0	B	9.5	35.5	19.7	
9.3	44.1	23.1		9.5	40.6	5.8	B	9.5	46.0	57.1		9.0	29.1	7.2	K	9.5	1 51.4	3.3	
9.0	45.0	16.2	B	9.2	57.1	16.7	B	9.1	57.6	37.5		9.2	43.1	13.2	K	9.0	2 28.2	59.4	K
7.4	24 2.1	23.6	L	9.3	50 38.0	22.8		9.0	13 7.2	23.9		9.3	33 1.6	9.2		9.5	3 14.1	36.6	
9.4	11.9	47.1		9.2	45.0	32.2		9.1	9.8	27.2		9.1	4.2	40.3	K	8.8	54.7	55.7	S
9.3	27.9	40.4	B	9.1	51 11.0	57.0	K	9.5	40.0	50.2		9.5	39.6	19.8		9.3	58.0	7.4	
9.3	25 13.7	58.6		9.2	45.2	48.0		9.3	14 0.4	0.2		9.5	34 30.0	18.1		9.5	4 29.6	7.5	
8.9	17.1	31.9		9.1	52 1.5	51.3	K	9.3	31.2	0.6	K	9.3	31.5	55.1		9.5	30.4	18.7	
9.3	26 3.3	51.8		9.5	51.6	4.4		6.5	53.6	28.0	K	7.0	36.2	37.0	K	9.2	5 20.5	30.1	
9.5	18.9	24.6		9.0	53 7.6	26.7	K	8.6	54.7	28.0	K	9.4	59.8	19.8		9.1	33.3	16.8	
9.1	27 35.4	13.5		8.9	54 5.5	50.3	K	9.5	57.4	31.7		9.3	35 11.4	34.6		9.5	34.0	22.0	
7.3	28 9.0	47.3	K	8.0	32.5	27.3	K	9.3	15 15.1	58.7		8.2	35.2	13.4	K	9.5	47.2	21.9	
9.4	34.3	59.6		9.4	40.0	20.8		9.2	15.8	57.7		9.0	35.8	14.2		9.5	53.5	25.5	
7.5	44.1	48.1	K	8.8	55 5.0	51.0	K	9.5	59.4	50.6		8.0	39.7	55.8		9.5	55.3	32.5	
7.5	44.3	46.3	K	8.7	5.9	13.5	B	9.5	16 5.9	24.1		9.2	37 22.4	57.5		8.9	6 29.4	15.8	K
8.4	30 6.8	24.4		7.8	29.0	3.9	L	9.5	36.1	59.4		9.5	28.2	47.4		9.2	58.2	35.5	
9.3	17.2	15.0		9.4	56 16.2	37.8		8.7	36.9	52.8	K	9.2	34.3	58.9	K	9.5	7 16.8	18.9	
9.3	55.2	49.3		7.9	25.0	23.3	K	9.5	17 2.6	18.5		9.3	38 4.8	31.6		9.5	8 17.5	16.4	
9.0	31 15.1	11.0		9.5	57 29.3	57.9		9.5	3.5	23.1		8.0	10.0	14.6	L	9.5	43.1	53.1	
8.9	24.5	43.0	B	9.5	32.0	45.2		8.4	7.7	34.2	K	8.6	40 0.0	58.2	K	8.3	43.2	40.1	L
9.5	36.8	33.9		9.0	45.6	12.9	K	9.5	9.1	21.1		9.5	41 14.0	33.7		8.9	50.7	38.4	
9.4	33 1.6	33.9		9.1	58 4.0	55.7	K	9.5	37.2	1.0		9.5	18.7	39.4		9.1	54.6	28.9	K
9.4	39.1	21.0	B	9.5	10.4	31.8	B	8.3	18 12.7	11.0	K	9.5	42 12.3	25.5		9.4	57.3	15.4	
9.4	34 2.5	24.9		8.8	11.0	10.9	K	9.1	17.7	51.4		9.0	18.0	58.1	K	8.0	9 38.7	18.2	K
8.2	3.3	39.2	L	9.3	19.7	42.7		9.4	57.0	2.2		6.2	34.2	32.9	K	9.5	10 19.5	11.7	
9.0	7.3	50.5		9.2	52.4	15.0	K	8.5	19 47.6	57.9	K	9.5	49.7	58.7		9.5	30.2	9.4	
8.6	35 27.5	25.8	K	9.0	59 0.9	45.5	K	9.6	55.1	16.3		9.5	59.0	44.4		9.5	43.3	31.9	
8.9	30.0	52.7	K	9.5	19.3	17.9		9.5	20 23.9	4.1		9.4	43 0.0	50.6		9.5	50.4	28.4	B
9.4	51.2	0.4		6.7	26.4	51.9	K	9.2	38.5	34.2		9.5	14.6	38.7		9.4	51.0	57.9	
9.4	51.8	5.4		8.0	0 27.4	3.1	L	9.5	53.1	26.4		8.3	51.1	31.5	K	9.4	12 1.0	31.0	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	9ʰ	+42°			9ʰ—10ʰ	+42°			10ʰ	+42°			10ʰ—11ʰ	+42°			11ʰ—12ʰ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.0	13 27.6	49.1	B	8.5	45 41.9	51.1	K	9.5	18 35.0	47.0		9.1	55 22.5	39.0		6.5	35 54.9	31.8	K
9.5	43.8	13.9		9.3	53.7	10.3		9.3	52.7	3.1	B	9.0	51.0	38.5		9.0	36 5.8	16.9	
8.4	14 3.2	29.3	K	9.5	46 13.8	57.2		7.0	52.9	20.3	K	9.0	56 9.8	5.3	K	9.5	37 6.9	1.0	
9.5	15 4.0	27.3		9.1	49.4	50.5		9.5	20 29.4	43.1		9.1	11.0	21.7		9.5	18.3	21.3	
9.2	31.3	25.2		9.5	47 42.9	52.8		8.1	21 52.5	13.0	B	9.5	58 0.2	24.5	B	9.1	36.7	1.0	
9.5	39.2	21.4		9.5	45.0	4.2		9.2	22 25.7	24.5	B	9.2	59 14.8	48.6		9.4	39 8.3	14.9	
9.3	16 15.4	0.3		9.2	57.5	7.8		9.4	28.0	21.0		8.5	1 34.8	43.0	K	9.5	40 43.7	13.4	
8.1	40.6	34.1	K	9.5	48 29.4	13.2		8.5	24 41.4	27.8	K	9.5	43.8	54.5		8.5	42 22.8	8.4	K
9.4	17 6.8	25.4		8.0	49 10.8	17.1	K	9.2	25 19.4	43.6	K	9.5	3 22.9	35.6		9.5	48.3	46.3	B
9.5	37.2	5.3		9.3	50 0.5	28.1		8.9	26 31.3	36.9	K	9.1	7 23.8	17.2		9.0	43 1.4	30.9	
7.7	18 10.6	13.9	K	9.3	18.8	46.5		7.1	35.9	39.4	B	7.4	8 52.1	30.8	G	9.0	44 46.7	40.8	
9.5	25.4	38.2		9.4	23.0	23.0		9.5	41.0	38.2		8.2	9 25.8	33.8	B	9.0	45 19.4	13.4	
9.0	19 2.3	9.9		9.5	51 55.1	37.4		9.1	58.6	39.4	B	9.5	10 59.7	24.1		9.0	53.3	23.4	
9.3	44.1	42.3		8.8	52 39.5	17.0	K	9.5	27 56.9	22.3		9.1	11 38.2	47.1	K	9.5	46 5.0	44.3	
8.7	52.7	7.3		8.6	46.9	10.0	K	9.0	28 30.0	53.2	K	8.5	12 1.5	5.8	K	8.8	47 42.3	24.9	K
7.3	20 46.4	53.8	K	9.4	53 16.4	26.0		9.0	31 4.0	43.7	K	8.8	43.2	36.2	K	7.0	48 53.6	50.2	K
9.5	22 41.8	32.2		8.5	58.8	2.7	L	9.5	18.9	44.6		9.3	57.0	6.8		8.5	49 33.8	11.0	
8.3	56.3	58.1	K	8.7	54 26.0	54.8		9.5	52.6	43.0		9.2	14 24.5	19.7		9.5	50 14.9	4.5	
9.5	23 23.9	24.8		6.9	30.9	42.4	K	7.7	32 6.9	54.5	K	8.5	15 22.9	35.6	K	9.1	49.8	37.8	K
9.2	43.0	46.9		7.3	35.4	0.0	K	7.5	20.4	16.8	K	9.5	26.3	6.5		9.2	51 39.6	53.5	
9.5	24 7.3	31.2		8.8	56 7.5	24.1		8.5	34 35.6	39.2	K	9.4	58.8	44.4	B	9.5	43.2	0.2	
8.5	25 28.4	1.5	K	9.2	49.4	20.2	B	9.2	35 38.4	22.8		8.6	16 4.3	38.1	K	9.5	52 50.3	11.8	
9.1	32.0	5.8	K	9.0	57 19.0	56.8		9.5	39.7	39.6		9.5	52.7	16.6		9.5	58.7	53.7	
9.0	26 41.6	38.1		8.9	47.7	37.6		7.2	36 20.3	29.2	L	9.4	19 23.2	54.5	B	9.5	54 1.8	1.0	
9.0	44.4	19.2	K	9.3	52.3	53.5		7.2	37 1.4	4.3	K	9.4	27.5	51.2		7.8	55 6.9	5.8	K
9.2	46.8	50.0		8.1	59.0	59.6	K	9.2	13.4	47.9	K	9.3	43.3	21.2		8.7	22.0	1.5	K
9.5	27 1.4	34.3		9.5	58 11.4	44.8		9.5	40 21.9	48.1		9.1	20 17.9	51.7		9.2	56 5.5	13.9	K
9.5	6.8	43.2		9.0	59 29.5	35.7	K	7.7	41 6.4	7.9	K	9.5	21 2.9	30.7		9.5	30.8	51.3	
9.5	36.4	7.5		9.2	36.4	28.1		9.5	11.4	59.8		8.4	29.7	53.3	K	9.3	41.7	14.0	
9.2	47.2	32.7		9.0	0 43.1	9.0		9.1	33.5	16.8		9.3	52.6	4.3		9.4	57 39.0	27.0	
9.5	28 58.9	43.2		9.5	1 16.8	54.6		9.0	44.9	19.3	K	9.5	22 21.3	3.3	B	9.4	43.0	22.5	B
7.9	30 16.6	56.0	K	9.3	2 16.8	46.0		9.4	42 51.5	14.2		9.0	28.8	49.3	K	9.5	58 19.6	17.4	
7.5	32.9	43.0	K	9.4	23.1	7.0		8.2	43 0.9	20.2	L	9.5	28.9	3.4		8.5	59 40.5	25.9	K
9.0	40.2	13.9		9.5	42.9	32.6	B	9.3	19.0	20.3		6.8	59.3	6.5	K	7.3	0 14.5	53.2	K
9.5	31 49.5	10.7		7.5	43.7	26.6	K	9.5	44 31.8	43.5	B	9.5	23 23.4	0.1		8.8	1 47.9	16.5	K
9.5	32 13.8	31.9		9.3	49.4	7.7	B	9.3	45 47.7	18.8		7.5	24 5.8	15.9	G	9.1	3 2.0	22.9	K
9.4	26.9	14.6	B	9.0	3 40.3	8.1		9.0	46 3.0	12.7	K	8.5	46.7	34.3	K	9.5	57.0	9.0	
9.3	58.2	44.8		9.1	4 26.8	8.7	K	7.5	18.2	5.8	K	9.5	49.3	40.8		9.1	5 30.9	7.0	K
9.5	33 55.0	39.6		9.4	36.5	37.5		9.4	24.5	59.0		9.2	27 6.3	1.5	K	9.5	6 4.0	28.5	
9.5	34 18.5	10.8		8.1	39.8	35.5	K	8.5	47 7.7	13.2	K	8.3	22.4	26.4	K	9.5	19.0	11.5	
6.9	35 0.7	42.9	K	9.5	44.2	53.8		9.5	33.5	13.2		9.3	32.9	48.3		7.5	44.7	58.2	K
9.2	20.5	54.2		8.3	5 6.5	32.5	K	6.3	59.0	46.6	K	9.3	28 27.6	28.4		9.5	7 2.2	45.0	
8.9	20.6	24.4	B	8.8	36.8	48.9	K	9.0	48 52.8	40.1		8.9	32.8	36.9	K	9.5	56.5	51.3	
9.5	37 21.0	48.7		7.5	6 39.5	35.0	K	7.3	53.2	5.9	K	9.1	58.3	44.8	K	9.5	8 16.0	32.4	
9.2	35.2	23.6		8.7	7 45.0	32.1		9.3	49 5.8	33.6		8.3	29 13.3	51.2	K	9.5	16.4	15.5	
9.0	39 21.9	31.5		8.8	45.2	7.8	B	9.2	10.6	59.8		9.3	30.6	28.4		9.5	19.6	58.5	
8.8	31.7	53.6		8.5	56.5	0.7	K	9.4	17.0	10.0		9.4	46.8	55.6		8.5	56.4	41.9	K
8.9	35.4	24.6		6.8	8 37.2	11.2	K	9.5	51.3	13.2		9.1	48.3	20.0		9.0	9 12.5	38.9	
8.9	40 51.2	13.2	K	9.3	38.5	0.2		9.5	50 26.9	54.4		8.7	30 1.9	6.5	K	9.5	10 8.0	5.5	
9.3	55.5	54.2		9.2	10 58.0	43.0	K	9.1	35.2	9.8	K	9.0	4.3	37.8		9.4	23.6	16.5	
8.5	41 49.6	56.9	K	9.3	11 44.0	16.1		9.2	38.3	44.6	K	8.8	31 16.8	1.0		8.2	11 5.3	50.5	K
9.5	42 1.4	9.8		9.5	12 11.8	54.9		8.8	51 27.6	55.2	K	8.9	29.8	42.7	K	7.8	12 57.0	12.9	K
9.5	2.6	53.6	B	8.5	22.7	21.8		9.4	45.8	21.6		7.7	32 22.6	51.2	K	9.3	13 7.2	44.8	
8.2	23.5	11.2	L	6.7	23.6	34.5	G	9.4	52.1	4.8		9.5	29.7	31.9		9.5	14.5	19.4	
9.4	43 44.6	29.7		3.1	13 41.3	14.1	K	9.5	52 6.1	10.2		9.4	36.4	27.9	B	7.5	57.9	16.9	K
8.3	49.2	9.1	K	9.4	14 13.9	34.2		9.4	22.5	40.7	B	6.5	34 3.8	3.4	K	8.8	14 40.8	57.4	K
9.5	44 25.6	48.2		9.3	14.4	42.2		9.5	58.0	56.5		9.3	9.4	19.0		9.5	15 2.2	35.6	B
9.4	28.2	45.8	B	9.4	16 25.2	42.1		8.0	53 27.8	38.6	K	9.2	22.3	20.5	B	9.5	45.5	12.5	
9.5	34.9	53.4		8.8	29.8	56.8	K	9.4	54 40.3	44.1		8.8	33.3	16.9	K	9.4	54.5	40.3	
9.5	40.7	18.5		9.4	18 17.4	33.2		9.3	55 16.8	10.2		8.9	36.7	25.5	K	9.1	17 5.4	29.1	B

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	12ᵘ	+42°			12ᵘ—13ᵘ	+42°			13ᵘ—14ᵘ	+42°			14ᵘ	+42°			14ᵘ—15ᵘ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	17 18.0	25.8		7.9	52 53.2	46.0	K	9.3	31 9.3	41.4	B	7.0	13 10.4	40.1	K	9.3	46 57.1	25.2	
6.9	29.4	8.4	K	8.0	53 42.5	43.0	K	9.5	20.6	25.3		9.3	42.5	53.4		9.5	48 4.0	40.4	
9.5	39.0	49.7		9.5	54 9.2	59.5	B	8.0	21.8	10.4	K	8.9	14 10.3	19.3		9.3	59.1	50.0	
9.1	18 46.3	55.3	K	9.0	18.1	54.7	K	7.5	26.0	56.4	K	9.3	11.1	38.2	K	9.2	59.1	59.3	K
9.5	19 50.1	21.8	B	9.5	23.0	55.6		9.1	32 17.8	13.3	K	9.0	15 4.9	3.3	B	9.3	49 35.1	48.4	
9.4	20 21.7	19.8		9.3	55 26.2	14.6		9.3	24.4	10.1		7.9	16 31.8	6.8	K	9.4	49.3	14.8	
6.5	26.4	9.6	K	8.9	56 12.2	14.1	K	9.3	33 43.6	9.1	B	9.1	56.2	13.5	B	9.2	50 2.8	22.2	
9.0	21 0.5	15.5	K	8.4	57 45.7	20.0	B	9.5	34 11.1	45.8		9.5	17 14.3	12.2		9.1	51 27.2	34.1	
9.4	15.0	27.5		8.3	58 40.4	10.4	B	9.2	35 41.4	5.5	K	9.1	28.6	34.2		9.1	40.6	34.7	K
9.3	20.4	52.6		7.6	47.2	27.0		8.3	49.9	56.8	K	9.4	18 24.5	34.7		9.4	52 13.9	25.4	
9.5	22 28.9	54.8	B	8.1	57.3	40.9		6.0	36 19.8	24.3	K	8.5	32.5	22.7	K	9.3	15.6	57.7	
9.2	33.5	47.7	K	7.6	59 24.1	19.1	K	9.3	42.8	24.3	K	8.7	42.5	53.0	K	9.4	16.5	13.5	
9.5	43.1	44.2		8.7	45.7	27.6		9.3	47.6	4.5		9.3	53.9	31.2	B	9.3	39.1	26.0	B
9.0	57.4	8.8		8.8	0 33.7	27.6		8.6	38 5.9	25.4	K	9.4	59.3	29.2		8.3	54 0.2	24.2	K
8.9	23 15.4	4.3	B	8.8	35.2	44.5	K	8.6	10.9	39.3	K	9.3	19 19.3	59.7	K	9.5	28.7	37.7	
9.2	25.4	3.4		9.5	1 18.4	34.6		9.5	27.8	5.5		9.5	28.6	16.8		9.5	55 20.5	47.0	
9.3	29.7	24.3		8.0	57.3	55.4	B	9.2	39 48.7	44.3	K	9.5	37.2	54.8		8.7	50.1	7.3	K
9.3	43.5	40.3		9.3	3 50.2	34.3		9.5	40 4.4	7.5		8.5	20 19.1	51.7	K	9.2	56 33.8	45.4	K
9.3	24 10.8	59.8		9.2	4 30.4	12.2		9.5	16.5	44.3		9.2	29.1	35.0	B	7.8	44.4	37.7	K
9.3	26 32.9	5.3	B	9.5	48.3	39.7		6.5	41 59.8	46.1	K	9.5	50.5	29.6		9.2	57 4.3	8.2	
4.5	51.4	8.0	K	9.0	7 25.4	39.8	K	9.5	42 37.6	28.2	K	9.4	21 25.2	37.7		9.4	16.3	17.0	
8.9	27 29.5	27.3	K	9.5	8 4.6	23.8	B	9.1	58.9	25.7	K	8.5	32.6	6.8		9.5	58 3.8	13.2	
8.8	43.2	34.3	K	8.8	59.8	49.3	K	9.0	43 56.3	32.1	K	8.1	55.1	29.7	L	9.2	59 10.4	53.5	K
9.5	31 21.2	38.8		9.5	9 16.1	47.8		7.2	44 49.0	53.0		9.3	22 3.3	35.7		9.3	53.9	57.5	
9.5	38.0	23.9		9.2	10 8.3	15.3	K	9.4	45 28.3	44.6		9.5	27.0	1.6		8.5	1 38.7	13.0	K
9.5	47.4	25.4		9.0	11 38.4	46.4	K	9.5	46.8	46.1		9.5	33.0	3.1		8.0	2 25.9	56.2	K
9.5	32 40.1	23.4		9.5	12 27.9	23.3		9.5	46 42.3	5.8		9.1	37.1	17.8		9.0	35.0	20.0	K
8.5	43.2	17.5	K	9.1	41.3	34.2		8.5	51.4	24.2	K	6.3	23 54.1	27.2	K	9.3	3 52.0	38.1	B
8.6	33 13.5	27.4		9.5	44.7	53.6	B	6.7	47 19.1	53.7	K	9.3	24 48.4	26.7	K	8.9	4 20.7	15.0	K
9.5	34 31.4	16.5		9.5	13 36.9	8.5		8.0	48 7.0	15.4	B	9.1	27 12.9	5.2	K	8.0	5 15.2	42.8	K
9.3	35 30.4	35.3		9.3	14 16.1	3.5	B	9.5	49 48.5	52.7		8.7	14.1	4.5	B	9.4	6 43.3	19.1	
9.5	33.5	47.5	B	8.5	28.6	30.8	K	9.5	51 16.5	30.9	B	8.7	29.1	10.8	K	9.0	54.9	38.7	B
9.2	36 27.9	9.1	B	9.5	40.2	54.7		9.5	53 20.0	40.1		8.7	38.0	49.4	K	9.1	7 6.7	50.6	
7.5	38.5	4.0	K	8.6	40.9	24.4	K	9.3	44.2	48.5	B	9.5	28 56.3	11.3		9.2	16.8	12.0	K
9.3	37 7.1	18.4		9.4	16 20.7	20.3	B	7.7	45.1	46.1	K	9.5	29 42.5	22.7		9.0	26.7	8.5	K
8.9	16.0	5.0		9.4	17 18.8	54.2	B	9.0	45.9	2.8	K	9.0	30 19.6	18.8	K	9.2	8 35.2	36.3	
8.9	45.5	19.3	B	9.5	35.4	37.7		9.5	54 12.8	57.5		9.2	32 25.5	31.2	K	6.1	55.8	42.8	B
9.4	39 46.0	52.3		9.5	18 27.3	15.8		9.5	44.3	24.0		9.0	34 0.6	11.3		9.3	9 33.0	37.0	B
9.0	40 56.7	18.1		9.5	19 43.6	35.3		8.8	55 17.2	43.6	K	9.0	7.1	30.2		9.5	34.3	13.5	
7.5	41 31.2	46.5	K	9.5	54.8	0.5		9.5	56 24.9	10.8		9.0	8.7	12.3	K	9.4	10 1.1	22.7	
7.5	59.5	21.7	B	9.5	21 21.4	55.8		7.8	25.6	3.8	K	9.5	35 9.3	1.8		9.5	9.4	1.8	
7.9	42 5.5	51.8	K	9.5	22 7.6	14.4		9.4	57 3.6	48.4		9.0	38.4	33.7		9.5	19.8	20.8	
7.8	41.7	52.0	K	7.2	46.0	59.1	K	8.8	0 38.4	28.7	K	8.9	40.6	7.3	K	9.5	54.5	52.3	
9.5	43 53.2	19.2		9.5	23 27.5	48.7		8.8	51.5	48.7	K	9.3	57.5	13.2		9.0	11 44.1	32.1	
8.5	44 4.6	3.0	B	6.3	25 0.2	51.5	K	7.0	1 27.0	47.7	K	9.4	37 58.1	2.3		9.2	12 50.8	48.6	K
8.5	26.2	40.5	K	9.5	21.9	4.0		9.1	33.9	15.8		9.4	38 13.6	5.3		9.2	13 25.3	20.9	B
9.5	43.0	32.1		9.1	31.1	17.9	K	9.1	3 48.4	48.2	K	9.5	42.5	53.8		7.7	53.5	16.2	K
9.4	59.1	29.0		9.5	26 15.4	40.8		7.8	5 2.2	51.7	K	9.1	51.2	0.9		9.5	14 23.9	25.8	
7.5	47 4.5	36.5	K	8.9	18.9	27.9	K	9.5	18.3	40.2		9.5	39 16.4	56.8		9.4	27.3	32.7	
9.5	31.4	31.5		8.8	57.3	39.3	K	9.5	41.4	25.2		9.0	48.5	24.7		9.5	15 30.8	44.1	
9.2	48 19.6	59.5		9.5	27 9.3	3.5		9.1	6 19.9	40.6		7.0	40 2.1	59.9	K	9.4	16 19.4	27.7	
9.5	55.8	49.4		9.5	19.6	26.4		6.1	8 32.8	12.8	K	9.5	41 22.0	21.2		9.0	48.5	38.1	
9.3	49 54.3	54.5		8.9	52.0	1.0		9.4	9 32.6	16.7		9.2	40.1	58.0	K	9.3	59.3	8.1	
8.3	50 34.7	56.1	K	9.5	57.4	59.3		8.3	47.4	7.8	K	9.5	42 31.6	55.7		9.5	18 11.1	34.7	
9.4	51 35.6	27.0	B	9.5	28 35.6	33 7		9.0	57.1	1.3	K	9.5	40.8	7.3		8.3	19 32.6	9.4	K
9.3	36.1	38.1		9.4	38.4	39.8		9.4	10 26.3	55.4		9.5	44 15.2	32.2		8.6	20 8.8	29.8	K
9.2	38.7	5.2		9.4	52.4	56.9	B	8.5	11 25.6	53.0		9.3	45 22.2	10.3		9.2	27.9	6.8	R
9.2	40.3	43.6		9.5	29 43.8	37.8		8.6	37.7	24.7		8.8	38.7	12.8	B	9.2	35.2	41.5	
9.5	52.8	12.7		9.5	30 11.5	36.3		9.3	12 28.9	31.3		9.3	46.9	8.8		8.6	37.8	20.7	L
8.6	52 19.0	57.3	B	9.0	31 6.1	16.9	K	9.2	35.1	55.0		9.2	56.2	41.6		8.5	45.5	42.2	B

2601—2660			
	15ᵃ	+42°	
m	′ ″	′	
7.8	21 58.8	3.8	K
9.2	22 14.1	40.2	
9.4	23 31.3	19.2	
9.3	35.5	44.4	K
8.0	54.2	3.3	K
9.5	24 5.3	23.2	
9.4	27.8	35.7	
9.3	44.7	54.5	K
9.3	59.2	34.4	K
9.4	25 1.3	22.7	
9.5	16.4	2.8	
9.5	26 29.9	58.5	
9.4	45.3	29.2	
9.5	27 20.8	19.3	
9.3	31.1	44.1	K
9.3	54.5	20.7	
8.1	28 9.1	18.7	K
8.7	14.8	25.2	L
8.6	29.8	14.3	K
9.5	30 0.8	18.7	
9.5	31 19.0	49.6	
8.3	32.6	37.1	L
9.5	33 40.8	31.2	
9.3	34 47.9	7.7	
9.4	36 9.1	53.2	B
9.1	13.3	55.8	
8.0	25.0	6.2	
9.5	35.5	14.0	
7.5	56.2	30.6	K
9.5	37 16.0	1.8	
9.5	38 10.3	37.0	
9.2	39 35.5	9.6	
9.2	40 1.8	32.9	B
9.5	24.7	34.4	
7.3	41 16.5	55.4	K
9.3	28.9	56.9	K
9.2	42 0.8	27.5	
7.9	1.5	10.2	B
9.0	54.0	28.0	K
9.0	54.2	19.0	K
8.5	43 43.8	47.4	L
9.2	49.4	24.5	K
9.5	53.7	40.0	
9.5	44 29.5	25.0	
7.3	46 4.4	59.7	K
8.5	6.1	54.0	K
8.9	47 5.5	29.6	
4.3	40.1	51.1	K
7.8	42.3	39.0	K
8.5	49.2	59.3	K
9.1	49 14.8	55.9	K
6.0	50 39.2	58.1	K
8.6	52 31.2	5.1	K
8.6	37.8	5.1	K
8.5	51.0	39.4	K
9.3	53 1.5	35.0	
9.1	1.7	27.6	
9.3	54 18.8	43.0	
9.1	31.6	26.0	K
9.5	58.6	58.8	B

2661—2720			
	15ᵃ—16ᵃ	+42°	
m	′ ″	′	
9.3	55 43.5	13.6	
9.3	48.0	47.4	K
8.8	56 20.5	15.0	S
8.2	28.8	14.0	L
9.3	57 13.1	14.1	B
8.8	43.7	53.4	
9.3	58 24.5	39.5	
8.9	59 42.5	18.1	B
9.4	43.6	36.9	B
9.3	0 25.6	7.6	
8.5	32.2	26.0	K
8.9	1 22.7	36.4	K
9.5	52.0	38.5	
9.5	2 32.9	3.8	
9.5	42.9	52.1	
9.3	3 25.8	26.6	
9.5	4 24.3	11.1	
9.5	5 4.0	24.6	
8.9	10.3	12.6	K
9.5	23.2	47.9	B
9.0	46.4	39.0	K
8.3	6 48.3	13.1	
6.3	7 1.0	45.5	K
9.3	23.8	5.7	
9.5	8 55.4	13.6	
9.5	9 14.4	22.1	
8.5	43.3	25.0	
9.5	10 31.5	27.1	
9.2	11 6.3	12.1	K
9.0	28.4	3.7	
9.2	31.8	11.0	K
9.0	32.7	50.5	
9.5	58.6	38.6	
9.4	12 53.6	59.3	
9.1	13 14.1	2.7	
8.1	31.8	58.8	B
9.5	57.8	3.5	B
9.0	59.4	23.6	K
9.4	14 31.0	9.4	
9.2	15 1.9	47.0	K
9.0	12.8	28.5	K
9.1	17 12.9	24.6	K
7.3	19 4.1	27.1	K
9.2	10.8	10.7	K
9.2	10.8	52.5	
9.2	16.8	42.5	K
8.0	20 3.4	20.1	K
9.1	38.3	25.1	K
7.5	41.2	51.5	K
9.5	51.9	42.0	
9.1	21 52.4	3.2	
9.3	22 23.9	42.0	
8.6	33.3	40.0	
4.9	23 53.0	12.8	K
9.2	24 28.4	2.5	B
8.8	44.2	29.7	K
9.3	25 33.8	26.6	K
9.3	26 49.4	46.1	K
7.5	49.9	29.7	L
9.1	27 32.1	27.7	

2721—2780			
	16ᵃ	+42°	
m	′ ″	′	
9.0	27 39.7	38.8	B
9.5	28 14.1	46.6	
8.5	46.6	11.3	K
4.0	29 26.8	44.8	K
9.3	27.4	4.3	K
9.4	45.5	28.2	
9.3	30 40.4	19.4	B
9.0	31 2.5	40.7	
9.3	32 3.9	47.8	B
8.2	33 1.6	41.1	K
9.5	2.2	22.2	
9.0	6.2	47.6	K
9.2	14.9	48.1	K
9.3	34 7.4	36.1	B
8.1	36 3.6	25.7	K
7.5	18.1	44.6	K
8.9	37 9.1	44.1	K
9.2	26.8	6.7	B
9.4	32.7	55.4	
8.5	38 34.1	34.2	K
8.0	52.6	52.8	L
8.3	39 24.4	45.7	L
8.5	28.9	58.7	L
9.5	40 1.1	4.3	
7.8	54.6	42.2	L
9.1	41 32.2	41.7	
8.0	55.1	2.4	K
8.7	42 36.0	1.4	L
6.5	41.6	30.6	K
8.2	43 46.1	29.6	K
8.7	44 54.8	47.1	K
9.5	45 23.0	48.1	
6.8	55.6	8.8	K
7.5	46 30.6	19.1	K
9.0	41.3	34.6	
9.1	48.3	9.8	
9.4	47 40.6	47.8	B
8.1	42.3	42.1	K
9.4	45.3	40.5	B
9.5	48 19.9	58.4	
9.2	55.2	19.7	
8.8	49 24.6	13.8	
8.8	31.8	55.4	K
9.1	49.9	47.5	
9.5	50 18.1	19.7	
9.5	32.7	42.1	
8.5	44.2	7.2	K
9.3	45.1	1.8	
9.5	58.6	51.1	
9.4	59.5	18.7	
9.2	51 52.6	51.8	K
9.0	52 14.1	39.1	
9.0	39.2	17.7	
6.8	53 17.6	43.0	G
8.8	49.4	10.9	K
9.5	58.6	20.2	
9.0	54 3.6	4.4	K
8.7	56.6	35.1	K
9.0	55 26.1	6.7	R
9.4	58.5	29.1	

2781—2840			
	16ᵃ—17ᵃ	+42°	
m	′ ″	′	
9.2	56 23.4	53.1	K
9.0	47.6	23.2	
7.3	57 0.9	56.4	K
9.4	43.3	20.9	B
9.1	58 36.4	12.7	K
8.0	39.2	6.8	K
9.1	42.1	35.1	
8.5	43.0	41.9	B
9.5	59 25.6	23.8	
9.5	39.7	19.3	
9.5	47.6	13.3	
9.5	0 59.0	56.4	
8.9	1 0.6	22.7	
9.5	7.8	28.6	
9.5	30.0	35.7	
9.0	54.1	2.3	
8.8	57.6	30.6	K
9.3	2 33.9	31.2	K
9.5	3 13.4	16.8	
8.7	28.6	17.3	B
9.5	52.6	33.6	
9.3	56.0	37.1	B
9.5	57.0	42.8	
9.5	4 53.6	2.8	
9.1	57.5	49.1	K
9.0	5 51.8	7.0	B
9.2	55.9	55.4	K
9.2	8 12.1	31.6	R
9.0	18.8	20.7	K
9.4	35.1	31.2	
7.3	57.1	17.7	K
9.3	9 38.9	11.8	
7.7	10 10.6	23.7	K
9.5	29.7	53.1	
9.5	38.6	3.2	
8.7	11 10.4	15.2	
8.7	33.3	24.7	K
9.3	38.1	46.4	B
9.5	38.6	1.3	
9.0	12 12.0	19.3	
8.0	54.1	38.1	K
8.0	13 45.9	15.7	K
8.0	14 2.6	2.7	K
9.4	27.0	47.4	
8.5	37.1	47.6	B
9.2	44.6	4.8	
9.2	15 19.3	57.1	K
9.4	25.2	51.1	
9.5	34.4	34.5	
7.9	39.0	0.8	L
9.5	16 23.6	5.8	
9.0	24.6	11.3	
7.5	56.8	22.5	L
9.2	17 6.9	53.4	K
9.3	12.6	41.6	
9.0	34.1	17.7	L
9.5	18 2.2	21.2	
9.3	5.7	52.3	
9.0	49.1	17.2	S
9.1	20 4.3	19.2	

2841—2900			
	17ᵃ	+42°	
m	′ ″	′	
9.5	20 24.8	17.5	
9.0	21 11.5	44.2	
9.5	39.0	45.7	
9.5	22 11.0	51.5	
9.5	13.2	12.3	
8.6	15.9	40.1	B
9.3	22.0	28.1	
7.5	43.0	21.3	K
9.5	46.5	41.2	
8.5	50.1	51.9	K
9.5	23 15.7	52.4	
9.5	20.8	50.3	
9.5	23.2	51.5	B
8.3	44.5	58.9	K
9.3	24 0.4	36.6	
9.3	28.7	6.1	
9.5	40.3	32.4	
9.5	40.5	38.0	
9.4	25 0.8	22.0	
9.5	3.5	41.4	
9.5	11.1	7.4	
9.1	12.5	44.3	
9.0	16.2	59.0	
8.6	16.8	51.7	K
9.0	40.0	20.9	
9.5	48.5	17.4	
9.4	49.3	13.6	
8.3	26 35.0	29.6	K
8.5	49.4	3.5	
9.5	58.5	52.1	
9.3	27 1.2	53.5	B
9.5	15.8	16.3	B
9.5	28 5.0	44.5	B
9.5	23.0	14.0	
9.5	29 20.3	53.3	
8.9	23.4	0.6	K
9.5	59.5	31.7	
9.5	30 0.7	27.9	
9.3	37.6	40.7	
8.8	31 20.2	30.3	K
9.2	20.2	52.3	
9.4	23.5	12.7	
8.8	33.0	5.4	
9.4	32 29.0	3.5	
8.5	50.8	1.8	K
9.5	51.3	41.1	
9.2	53.5	16.7	
7.2	33 17.9	55.3	K
8.8	49.3	47.7	K
9.5	52.3	27.5	
9.5	34 7.9	24.4	
9.5	27.0	6.4	
9.5	27.8	43.0	
9.5	59.5	30.4	
9.5	35 1.3	23.5	
9.5	19.8	58.9	
9.4	59.1	56.9	B
9.5	36 8.2	58.9	
9.5	33.8	8.9	
9.5	37 42.0	27.9	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	17ʰ	+42°			17ʰ—18ʰ	+42°			18ʰ	+42°			18ʰ	+42°			18ʰ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	38 28.5	26.8		9.5	52 8.8	3.5		9.5	6 19.7	12.1		9.4	22 23.7	47.3	B	9.5	38 22.3	20.8	
9.3	39 9.0	26.5		9.5	30.1	52.9		9.5	7 5.4	36.1		8.7	29.2	11.2		9.5	51.0	13.5	
9.3	20.1	50.8		9.5	39.9	58.1		9.0	8 23.5	34.2	K	9.2	47.8	22.0		9.5	55.0	55.0	
9.5	25.5	10.1		9.5	43.7	34.5		8.0	26.6	45.9	B	8.8	59.5	29.2	K	9.3	39 5.8	27.9	B
9.5	39.6	31.7	B	9.2	53 15.9	54.2	B	9.0	37.0	49.3		9.5	23 16.5	8.0		9.3	8.2	27.0	
9.5	40 9.3	1.5		7.7	32.4	1.5	K	9.0	39.0	49.2		9.0	28.0	29.6	K	8.9	11.0	41.1	
9.4	28.5	17.0	B	9.3	46.8	33.4		9.3	51.1	43.9		9.5	42.0	15.4		9.5	32.5	47.4	
9.4	32.0	38.3		9.5	48.8	6.5		9.5	58.2	1.9		9.0	24 21.1	24.1	K	8.0	40 3.1	22.9	K
8.4	40.3	38.9	B	9.5	52.2	8.2	B	9.0	9 14.4	0.3		9.5	28.5	13.6		9.3	29.7	36.5	
9.2	41 5.4	43.5	K	9.3	57.0	33.5		8.3	16.5	49.3	K	9.4	35.5	15.0		8.3	29.9	28.2	L
9.4	19.5	56.8		9.1	54 11.1	59.6	B	9.5	49.1	49.4		9.5	37.6	7.7		8.9	36.0	21.5	
9.0	26.8	29.6		8.3	14.5	34.4	K	9.5	10 1.5	31.4		9.2	25 0.5	42.4	B	9.1	41.3	24.2	
9.5	27.3	0.5		9.5	53.5	31.0		9.4	35.4	23.4		9.5	17.5	46.4		8.6	44.8	1.6	B
9.3	44.7	6.4		9.5	55 3.0	23.0		9.5	43.6	5.5		9.0	50.5	36.6		8.7	52.3	59.7	
9.5	42 12.0	10.8		9.5	5.0	9.3		5.5	11 8.3	7.8	K	9.5	26 0.1	46.7		9.2	58.0	21.0	
8.1	36.5	18.1	K	9.5	7.1	52.0		9.1	14.9	42.6		9.5	14.3	5.6		9.3	41 23.8	58.0	
8.9	43 2.1	48.5	B	8.0	23.7	2.4	L	9.4	43.5	16.7		8.8	48.5	41.5		9.5	38.6	14.9	
8.9	28.0	9.7		9.0	36.0	41.7		9.5	53.0	0.4		9.5	49.9	55.9		9.0	42 12.0	52.9	
7.3	28.5	36.8	K	8.3	46.7	7.9	L	9.0	53.1	40.8		8.8	51.6	9.1	K	9.3	22.3	51.0	
9.3	53.6	17.3	B	8.5	56 56.8	50.8	K	9.1	12 2.6	26.1		9.5	55.4	31.0		8.9	42.0	15.3	
9.4	54.7	18.8		8.0	57 9.7	21.9	L	9.4	3.0	39.7		9.5	27 12.3	19.6		9.4	43 15.5	36.0	
9.3	44 14.5	37.7		8.0	14.0	41.7		9.3	30.0	14.3		9.5	59.7	20.3		9.0	21.0	34.2	
8.0	28.0	26.4	L	9.3	21.9	2.4		9.5	47.4	52.2		9.5	28 4.0	53.3		9.5	24.6	44.7	
8.8	29.0	57.0	K	9.5	22.8	9.6		8.5	51.1	45.6	L	9.4	14.7	0.5		9.0	48.0	15.7	K
9.1	30.3	7.7		9.5	30.5	27.8		9.4	53.4	11.8		9.3	34.3	35.3		9.5	59.0	33.2	
9.3	33.4	2.1		9.5	51.0	33.8		9.3	57.8	26.5		9.5	53.5	36.2		9.5	44 23.3	33.2	
9.2	38.0	48.4		9.5	58 17.7	48.3		9.5	13 34.3	2.5		9.1	29 1.9	6.6	K	9.5	30.8	36.8	
9.5	45 19.1	25.5		9.0	20.5	33.1	K	9.5	57.9	6.3		8.8	7.8	20.0		9.5	58.0	28.6	
7.3	28.0	0.3	S	9.5	30.0	23.3		9.5	14 2.8	40.4		9.4	15.0	40.4	B	9.5	58.0	32.7	
8.9	53.7	8.3		9.5	49.8	54.8		8.3	7.0	31.0	K	9.4	48.4	15.0		8.5	45 10.1	54.7	K
8.8	46 27.1	50.2		9.1	59 1.1	53.8	K	9.5	48.7	57.3		9.5	52.5	59.9		9.5	15.0	45.0	
9.5	32.5	20.9		9.5	27.5	34.1		9.5	52.3	6.6		9.1	57.6	27.8		9.2	31.6	2.6	
9.5	40.6	10.8		9.5	28.8	16.9		9.5	15 14.0	6.7		8.6	30 2.2	33.1	K	8.8	36.3	57.5	K
9.2	45.4	3.5	K	9.4	44.8	12.9	B	9.5	24.1	54.4		8.8	13.5	53.9	K	6.8	46 0.0	42.6	G
9.5	47.5	34.3		7.7	46.3	5.6	G	9.3	46.6	0.1		9.4	48.6	7.2		9.3	1.0	51.2	
9.3	47 5.9	41.7		6.8	0 5.5	51.1	K	9.5	16 11.6	53.0		7.3	31 28.1	55.8	G	9.2	17.0	6.3	
9.1	22.8	57.8		9.1	13.1	18.4		9.4	31.5	35.2		9.2	31.4	10.1		9.3	22.0	13.5	
9.0	26.9	40.9	B	7.4	25.8	56.8	K	9.2	39.0	11.7		9.3	32.0	36.1		9.0	55.0	31.2	
9.1	42.5	35.5		9.4	46.1	40.7		9.5	52.2	41.1		9.0	34.0	8.8		9.5	47 4.6	3.3	
7.0	46.1	54.1	K	8.3	1 2.0	28.2	K	9.4	17 6.9	5.7		9.5	32 4.5	10.8		9.5	38.1	57.4	
7.6	48 29.7	14.3	K	9.5	35.5	1.0		8.8	20.5	51.9		8.8	26.9	36.9	G	9.5	38.3	54.0	
8.8	33.5	14.3		9.3	49.1	12.1		9.5	25.0	55.8		9.2	33 5.0	53.3		9.0	48 16.0	28.4	
9.5	43.5	25.1		8.6	55.5	56.6	K	8.3	25.7	4.7	B	8.5	27.4	32.9	G	8.6	53.2	44.7	G
9.5	45.8	16.1		9.0	2 5.2	40.8		9.5	27.6	5.5		9.5	57.6	2.8		7.0	57.3	42.5	G
9.5	51.9	15.2		9.0	50.4	33.5		7.3	29.5	12.3	G	9.5	34 2.5	20.4		9.5	49 11.5	0.4	B
9.4	49 4.5	35.2		8.5	3 15.8	52.6		9.5	29.7	2.2		9.4	8.8	25.0		9.4	21.3	5.2	
9.5	11.5	37.2		8.9	26.3	12.2		7.7	18 18.5	56.4	K	9.3	23.9	58.0		9.4	43.5	47.4	
9.3	15.0	34.5		9.4	38.3	40.4		8.8	27.7	17.5		9.4	48.7	42.0		9.2	50.0	12.0	
9.4	36.1	1.7		8.8	40.5	54.8	K	9.2	37.1	6.6		9.5	59.6	49.8		8.5	55.8	21.1	L
9.2	36.5	15.7		8.2	4 12.0	36.9	K	9.1	19 23.3	23.0		8.5	35 15.4	42.5	K	9.4	58.9	52.9	
7.5	37.0	41.8	K	9.5	30.1	45.3		8.5	33.7	2.9	K	8.0	37.8	55.7	K	9.1	50 10.5	18.1	
9.3	56.0	57.9		9.4	45.7	25.4		9.1	36.5	28.5	K	8.4	54.1	59.9	K	9.5	25.7	28.1	
8.8	59.8	1.8	B	8.8	55.3	16.0		9.5	44.5	59.5		9.3	57.7	3.6		8.5	25.8	22.8	L
9.2	50 12.3	47.9		9.4	5 0.5	42.8	K	6.7	45.0	24.4	K	9.0	36 0.3	45.9	K	9.1	51 14.5	33.9	
9.4	33.0	31.4		9.5	25.3	40.5		9.5	20 25.1	14.3		8.3	15.7	49.9	K	9.3	16.8	47.4	R
9.4	34.0	27.0		9.5	29.3	47.6		9.3	21 3.2	31.3	K	9.3	33.2	13.0	B	8.8	17.6	0.6	L
9.0	47.8	54.7		9.5	34.3	46.1		8.8	39.0	54.8	K	9.4	48.5	45.9		9.1	26.6	1.5	K
9.4	51 26.1	52.3		9.5	34.3	42.6		8.9	41.5	38.0		9.0	37 41.5	4.2		9.5	40.3	2.0	
9.4	27.9	6.8	B	9.0	6 0.9	4.7		9.4	47.5	42.5		9.5	38 2.6	12.6		9.3	56.7	25.8	K
9.1	42.5	31.8		9.4	3.0	19.8		9.5	22 17.5	27.5		8.6	18.0	14.2	K	8.5	52 10.5	20.8	K

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	18ʰ—19ʰ	+42°			19ʰ	+42°			19ʰ	+42°			19ʰ	+42°			19ʰ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	52 33.8	49.5		9.4	6 0.2	53.8		9.5	18 12.1	57.5		9.3	29 2.5	43.6		9.1	40 24.5	47.7	
9.5	35.0	55.3		9.0	14.0	40.5		9.5	15.3	49.9		8.2	2.8	2.9	K	8.8	26.4	12.2	K
9.3	53 2.0	0.1		9.4	18.7	12.5		9.5	21.3	4.3		9.5	9.0	16.8		9.5	37.1	59.4	
9.4	12.7	12.0	B	9.5	23.0	56.0		9.4	21.8	6.9	R	9.5	22.3	40.6		9.1	37.8	11.0	K
9.5	18.9	2.4		9.2	23.5	47.8		6.5	23.5	41.2	G	9.4	41.1	28.5		9.5	49.5	19.2	
8.1	35.5	29.1	K	9.4	42.0	13.1	B	9.2	31.4	3.1		5.8	57.9	5.0	G	9.4	54.0	8.5	
9.4	51.6	3.3		9.5	53.1	54.3		9.2	19 11.7	57.0		9.2	30 14.0	48.5	K	9.4	41 11.5	21.5	
8.3	54 24.0	44.3		9.5	7 4.9	15.4		8.9	26.9	57.9	K	9.4	19.5	24.6		9.5	11.8	24.4	
9.2	24.5	26.3		9.3	16.5	34.0		9.5	32.5	20.8		9.4	20.4	1.7		9.5	14.0	14.8	
9.3	31.0	21.8		9.2	18.0	25.0	B	9.5	40.0	48.5		9.3	58.7	54.3	K	9.0	18.6	5.5	
9.4	39.0	26.7		9.5	26.7	25.5		8.6	41.0	39.1	L	9.0	31 2.8	36.7		9.0	36.9	40.2	
7.5	55.0	48.5	L	9.5	39.5	52.6		9.4	59.2	3.3		9.3	4.4	18.7		8.3	43.3	21.5	
9.5	56.6	7.0		9.4	41.1	20.5		9.1	20 2.0	19.7		8.4	4.9	2.6	K	9.5	46.0	33.2	
9.5	55 2.5	41.8		9.5	43.2	45.0		9.4	23.6	25.3		9.5	32 1.9	27.0		9.5	51.7	55.4	
9.5	24.0	26.7		9.2	49.6	1.6	K	9.5	26.8	36.0	B	9.5	25.7	45.6		8.8	42 2.4	25.1	
9.5	47.1	31.9		9.5	8 1.4	23.5		8.6	30.9	9.1	K	9.3	25.7	44.7		8.8	4.3	30.2	
9.5	56 8.2	54.7		9.1	15.5	18.3	K	9.5	47.1	39.8		9.5	25.7	16.6		9.5	13.9	21.5	
9.5	9.2	17.0		8.9	24.5	15.3	K	7.5	50.5	30.8	K	8.2	29.0	55.5	K	9.5	18.6	27.6	
6.6	14.4	3.3	B	9.5	52.7	16.2		9.5	21 14.7	26.0		9.5	31.8	47.4		9.5	18.7	11.1	
9.3	17.1	55.1	B	8.5	54.0	39.5	K	7.6	23.4	2.1	G	9.5	36.7	4.6		9.0	19.7	3.3	K
9.2	26.0	35.0		9.5	9 4.9	16.4	B	9.2	32.5	49.1	K	9.5	40.3	12.0		9.5	24.1	51.3	
9.4	39.0	1.4		9.5	27.6	2.0		9.2	48.1	46.0	K	9.0	40.5	27.4	R	9.5	32.0	30.9	
8.4	43.7	11.1	K	9.5	45.5	39.8		9.5	22 12.8	29.1	B	8.7	33 15.9	52.8	K	7.9	37.3	7.5	K
9.3	55.5	16.6		9.5	56.8	56.9		9.3	31.2	2.6		9.0	20.4	13.4		9.5	53.1	58.4	
9.1	59.1	42.0	B	9.4	10 12.0	13.9		9.0	35.5	48.8	K	9.0	24.1	30.7	K	9.5	43 0.0	35.8	
9.5	57 13.5	47.8		9.5	36.0	49.8		9.5	37.4	57.7	B	9.1	27.9	41.5		8.7	6.2	34.0	
9.2	19.6	17.7	K	9.2	39.4	10.5		9.0	43.6	13.5		8.9	29.2	6.2		9.5	8.4	22.6	
9.5	26.9	6.2		9.4	58.9	34.3		9.0	43.8	47.1	K	9.4	57.1	52.5		9.5	10.0	30.0	
9.3	40.2	43.8		9.5	11 10.8	7.6		9.4	23 12.7	5.4		9.5	34 6.3	50.9		9.5	12.3	13.9	
8.0	43.0	46.5	L	9.0	17.4	55.6		8.8	15.5	40.4		9.5	13.7	2.6		9.5	28.5	59.5	
9.4	50.1	37.0		9.5	49.7	42.6		8.4	16.0	27.6	L	9.5	16.5	0.2		8.9	30.2	45.7	K
9.3	58 0.4	18.1		9.5	57.2	4.7		8.3	25.1	53.6	K	9.5	43.0	2.6		9.2	36.8	42.5	
7.7	6.5	53.9	K	9.5	12 5.0	28.3		8.5	33.0	33.2		6.0	43.2	28.9	K	9.0	38.3	47.0	K
9.3	15.0	57.2		9.3	11.5	39.5	K	9.5	44.8	59.4		9.4	48.3	25.6	B	9.5	44.8	58.4	
9.5	24.6	53.2		9.0	28.5	33.6	K	9.5	24 8.9	26.3		9.4	49.8	56.7		8.4	51.5	44.5	K
8.6	26.5	19.4	K	8.8	32.5	48.1		9.0	22.1	0.9		9.4	35 12.2	49.6		9.5	56.1	19.9	
8.6	34.0	31.8	K	9.4	42.7	42.3		8.3	24.1	52.7	K	8.8	18.1	44.9		9.4	44 2.1	3.0	
9.4	59 30.4	57.0		9.1	45.1	12.5		9.4	32.5	1.8		9.5	46.5	27.6		9.5	11.6	36.9	B
9.4	32.5	47.4		8.5	50.8	0.2	R	8.0	38.0	20.9	L	6.7	58.6	44.3	K	9.4	12.7	23.4	
9.5	0 18.5	32.9		9.0	13 13.9	38.4	K	9.2	56.7	5.8		8.5	36 23.4	55.5		9.5	16.0	47.2	
9.5	28.7	27.8		9.4	24.7	9.5		8.6	25 20.1	53.4		9.0	24.6	34.6		9.2	20.6	15.7	
9.5	41.5	20.5		9.5	30.3	7.2		9.4	47.7	27.9		9.5	37 43.6	54.2		9.3	45.1	34.2	
9.2	46.9	36.0	B	9.3	36.5	41.5		9.4	47.9	59.9		9.3	51.5	28.2		9.5	49.2	23.5	
9.5	53.3	48.1		9.3	57.7	10.1		8.0	51.5	51.6	L	9.5	56.8	53.6		8.4	50.7	32.4	L
9.4	1 18.3	31.2		9.1	14 5.9	56.5		8.9	56.3	39.1	R	8.5	38 4.4	18.5		9.3	45 2.6	47.2	
9.3	39.0	25.0		9.1	24.9	25.2		8.9	58.7	21.7	B	9.5	26.9	10.7		9.5	3.1	4.4	
9.0	2 21.5	11.8		8.8	26.4	54.0	K	8.1	26 3.5	43.3	G	9.3	36.2	1.6		9.3	14.2	16.2	B
8.7	22.0	27.3		8.8	31.8	23.2		9.4	12.4	4.2		9.4	45.0	31.8		9.5	18.7	24.1	
9.4	39.6	18.4		8.7	36.3	1.0		9.3	13.5	48.1	B	9.1	57.1	40.0		9.5	29.1	44.5	
9.2	3 1.8	4.5		8.4	43.2	21.5	B	9.1	23.3	11.8	R	9.5	39 7.2	49.3		8.1	53.7	0.7	B
9.5	42.0	50.8		9.1	15 7.6	16.6	K	9.5	26.7	59.5		9.5	14.2	25.9		9.5	46 3.0	25.9	
9.1	48.9	24.6		9.5	44.0	47.4		6.8	38.5	39.9	G	9.4	24.6	24.0		9.5	5.1	40.3	
9.5	4 9.9	10.4		8.3	57.0	15.4	K	9.5	57.1	39.8		9.1	29.4	53.2		9.5	21.5	8.9	
9.0	25.3	51.9	R	9.5	16 9.7	51.2		9.2	59.0	32.5	R	9.4	34.3	5.1		9.5	24.0	34.4	
9.4	48.5	53.6		6.5	24.0	24.6	K	9.5	27 19.0	23.3		8.5	35.2	52.2	K	9.5	24.9	33.5	
9.1	5 23.4	10.0	R	9.5	58.0	50.5		9.0	41.5	19.5	R	8.8	44.4	5.1	K	9.5	29.1	8.1	
9.3	23.8	35.0		9.5	17 21.1	20.5		7.8	28 31.7	29.2	L	9.5	47.6	22.5		8.8	43.8	13.0	
7.0	51.2	22.5	L	9.4	34.2	52.9		9.2	53.5	43.3	K	9.0	53.7	59.7	K	9.5	50.8	54.5	
9.4	51.4	5.4		9.5	49.7	54.3		9.2	55.9	16.5	B	9.3	40 2.3	12.8		9.5	47 2.5	44.3	
9.1	52.0	34.0		8.8	55.5	9.4		9.5	56.0	47.0		9.5	6.8	5.9		9.5	30.1	20.6	

3501—3560			
	19ᵘ	+42°	
m	′ ″	′	
9.5	47 36.4	49.3	
9.5	41.3	36.4	
9.5	50.2	16.5	
9.4	48 8.0	54.0	
8.5	11.3	39.0	
9.0	12.3	24.1	
9.0	13.4	25.0	K
8.3	23.4	15.8	K
9.5	24.1	1.9	B
9.5	27.2	0.9	
9.5	50.9	8.5	
9.0	49 4.8	8.9	
9.2	12.3	26.3	
8.8	22.1	11.2	
9.5	32.2	57.2	
9.5	33.5	18.5	
9.3	48.3	6.4	
9.0	48.4	2.1	
9.4	50.3	37.9	
9.5	50 3.6	54.8	
9.4	14.7	49.8	
9.5	27.4	59.5	
9.4	34.3	44.4	
9.3	40.9	36.0	
9.2	41.0	25.7	
8.7	52.7	38.3	
9.4	57.4	46.2	
9.2	58.3	8.2	
8.8	51 6.9	28.3	
9.3	24.5	20.9	
9.5	27.9	54.6	
9.1	38.2	50.9	
9.5	38.5	0.6	
9.5	44.4	8.8	
9.2	49.3	33.7	
8.5	52 17.4	50.1	K
8.8	25.8	15.0	
9.1	37.0	28.4	
9.5	37.9	5.1	
9.0	40.1	53.1	K
8.9	40.8	39.5	
9.5	53.0	29.9	
9.0	53 1.7	56.3	K
8.5	19.5	8.2	L
8.6	44.8	0.0	L
9.1	48.2	37.1	
9.5	52.1	11.3	
8.9	54 1.3	54.3	K
9.5	21.4	9.2	
9.5	21.8	5.7	
9.3	48.4	49.7	
9.5	58.8	36.7	
9.5	55 0.1	46.0	
9.4	15.6	4.6	
9.3	18.5	59.7	
9.3	39.9	50.8	
9.5	40.7	4.5	
9.1	41.6	31.4	
9.2	56 7.6	22.1	
9.4	19.1	24.2	

3561—3620			
	19ᵘ—20ᵘ	+42°	
m	′ ″	′	
9.5	56 19.8	18.7	
7.2	22.7	38.7	K
7.8	33.3	49.7	B
9.3	53.6	2.5	B
9.5	57 5.9	2.6	
9.3	8.2	45.7	
9.5	31.5	35.4	
9.4	58 0.0	51.4	
9.0	2.1	48.9	
9.4	6.6	52.0	
9.5	30.1	26.2	
9.2	32.4	35.2	
9.5	39.2	25.6	
9.4	52.3	48.1	
9.5	59 7.6	56.8	
9.2	11.1	13.8	
8.9	14.5	6.7	
9.1	16.1	39.4	
9.5	32.7	16.8	
9.5	45.4	15.5	
8.7	56.2	48.2	K
9.5	57.5	3.9	
9.5	0 9.3	46.1	
9.5	12.3	36.9	
9.5	55.8	43.3	
9.0	1 2.2	36.1	
9.0	20.9	37.1	K
9.5	22.6	48.4	
9.4	36.8	48.4	
8.0	37.5	40.5	K
9.2	52.7	49.5	
9.0	2 14.0	14.1	
9.5	18.2	59.3	
8.7	23.8	35.6	K
9.3	35.9	53.9	
9.4	36.6	30.8	
8.7	46.4	32.5	K
8.6	3 4.0	2.1	
7.8	13.0	11.1	K
9.5	17.6	29.5	
9.5	24.9	12.8	
9.4	29.5	42.5	
9.1	42.8	23.3	
9.5	51.5	32.8	
9.5	55.0	47.1	
8.3	4 0.0	6.7	K
9.5	4.7	25.5	
8.8	6.3	27.8	
9.5	14.2	39.6	
9.3	21.2	28.4	
9.5	22.2	45.4	
9.5	22.2	42.9	
8.5	26.3	50.4	B
9.5	50.5	56.0	
9.5	50.9	31.8	
7.5	51.1	7.0	K
9.4	5 17.1	52.6	
9.5	18.4	53.6	
9.5	33.3	50.1	
9.4	39.6	55.7	

3621—3680			
	20ᵘ	+42°	
m	′ ″	′	
9.5	5 40.0	29.6	
9.4	44.1	52.0	
9.4	44.2	31.0	
7.3	6 0.1	39.4	K
9.4	2.1	16.0	
9.4	6.7	26.0	
9.5	16.6	26.7	
8.3	17.3	48.1	K
9.5	26.0	11.3	
9.5	30.0	6.0	
9.4	49.0	43.3	
9.5	50.3	41.6	
9.0	7 5.1	41.4	
9.5	5.9	55.7	
9.5	28.5	0.6	
8.1	30.0	40.5	G
9.2	39.0	47.3	
7.7	8 3.8	23.9	L
9.5	9.7	4.5	
9.5	34.0	23.3	
9.4	38.8	47.5	B
6.4	50.1	56.3	G
9.1	50.2	16.3	
9.4	54.8	8.7	
9.5	9 6.3	33.0	
9.5	10.7	10.3	
9.5	11.2	9.8	
9.3	23.0	25.9	
8.7	28.2	50.4	G
9.5	46.8	4.2	
7.3	10 6.2	27.7	K
9.0	10.6	22.8	
9.4	15.3	14.5	
9.4	26.4	14.7	B
9.5	39.2	54.2	
9.4	52.3	7.1	
9.4	57.1	30.8	
9.4	11 5.2	18.0	
9.1	11.5	3.3	
9.5	14.0	43.9	
9.5	16.8	52.3	
9.1	34.9	22.2	
9.5	38.4	56.0	
9.5	54.8	53.8	
8.2	55.0	52.8	G
8.3	55.4	25.4	
9.2	12 16.6	8.7	
9.3	25.5	27.0	
9.4	30.0	35.6	
6.5	31.7	16.3	K
9.2	38.1	41.0	
8.7	38.5	44.2	G
9.3	40.2	31.7	
9.4	55.3	12.6	
9.5	57.2	46.0	
9.4	57.9	52.1	
9.2	13 2.4	31.0	
9.5	13.0	6.2	
9.3	14.5	36.9	
9.4	26.8	1.9	

3681—3740			
	20ᵘ	+42°	
m	′ ″	′	
9.3	13 32.2	22.3	
9.3	40.6	23.5	
9.3	43.4	8.7	
9.0	48.6	9.4	
8.3	52.4	16.5	K
9.4	52.7	40.4	
9.5	14 3.1	49.3	
9.5	4.0	57.3	
9.5	12.7	25.7	
9.5	17.5	28.9	
9.5	25.3	20.4	
7.6	27.2	32.6	B
9.5	32.7	54.0	
9.4	41.6	0.0	
9.0	53.3	49.7	
9.4	57.2	56.3	
9.5	15 12.5	28.1	
9.5	14.8	39.5	
8.9	15.2	9.2	K
8.9	22.0	7.0	K
9.3	22.5	58.3	
8.2	42.4	6.8	K
8.5	42.6	40.2	
7.8	16 4.4	55.3	L
8.1	10.6	13.8	K
9.2	23.2	43.3	
9.5	23.8	9.2	
9.3	27.7	32.6	
9.3	27.8	8.0	B
9.4	32.4	47.9	
9.5	17 1.8	41.1	
9.5	2.4	13.6	
9.5	4.9	58.2	
8.8	19.5	22.5	
9.4	27.6	6.5	
8.9	40.1	5.2	B
9.3	42.9	9.8	
8.3	52.0	13.3	K
9.1	54.4	3.2	
9.4	55.6	23.7	
6.3	56.2	31.3	G
9.4	57.7	43.5	
8.9	18 1.9	3.9	B
8.3	3.3	31.6	G
8.7	4.0	36.9	
9.0	15.0	57.5	K
9.3	18.0	51.3	
9.3	18.2	53.9	
9.1	24.6	50.2	
9.5	27.0	19.0	
9.3	51.9	4.7	
8.9	19 7.4	12.8	
9.2	19.2	3.9	
9.3	26.4	46.9	
9.4	45.4	51.6	
9.2	47.2	28.9	
8.3	57.3	18.6	L
9.2	57.6	51.4	
9.5	20 14.1	37.9	
6.9	23.8	8.3	K

3741—3800			
	20ᵘ	+42°	
m	′ ″	′	
9.1	20 39.5	10.5	K
9.5	52.0	27.3	
8.2	54.7	12.7	K
9.5	58.1	37.0	
9.5	21 9.6	8.2	
9.3	16.2	26.4	
9.0	43.8	23.1	
8.7	44.6	45.7	
8.7	47.7	25.9	
8.3	22 9.1	8.9	
9.1	12.0	59.9	
7.3	15.5	40.6	L
8.2	18.2	26.4	L
7.5	34.1	35.0	L
9.5	47.5	26.6	
9.5	23 10.0	27.2	
8.9	14.4	55.2	K
9.5	37.1	4.0	
9.4	37.4	3.0	B
9.3	40.0	40.0	
9.2	52.9	48.8	
8.8	24 3.8	15.1	
8.5	15.4	28.8	
8.9	56.7	57.0	K
9.4	25 10.1	5.4	
9.4	23.5	24.4	
8.8	29.5	15.7	B
7.5	32.2	58.9	K
9.1	42.3	9.7	
9.5	26 0.7	11.0	
9.5	11.6	6.2	
9.4	14.5	21.8	
9.5	40.7	16.3	
8.8	42.6	46.8	
8.8	27 11.0	34.2	
9.5	16.3	11.8	
9.5	29.4	53.7	
6.5	49.5	41.9	G
9.4	28 1.4	19.4	
9.4	11.2	10.3	
9.0	20.8	43.3	B
9.0	35.2	57.4	
8.7	36.1	31.4	
9.2	46.0	6.7	
8.5	29 11.9	57.6	K
7.4	13.0	52.1	K
8.8	17.2	39.8	
9.5	28.6	47.2	
9.5	45.8	49.5	
9.2	53.3	43.1	
8.6	30 8.4	21.3	K
9.5	10.4	23.1	
9.1	11.3	20.8	B
9.5	18.4	28.7	
9.3	31.9	58.5	
9.5	49.7	57.4	
9.5	31 2.8	29.8	
8.8	36.4	49.6	
8.2	42.9	6.2	K
8.5	53.8	16.0	B

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	20ʰ	+42°			20ʰ	+42°			20ʰ—21ʰ	+42°			21ʰ	+42°			21ʰ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	32 10.5	18.7		8.7	42 3.1	16.5		9.5	52 37.3	4.5		9.0	2 13.4	35.1	R	9.2	11 14.2	36.2	
9.5	11.0	7.5		9.1	11.7	41.4		9.5	42.4	47.1		9.5	3 16.5	43.6		9.5	26.0	6.5	
7.2	17.6	28.8	G	8.8	17.9	32.9		9.1	42.5	41.8	K	9.5	35.4	5.7		9.5	28.7	14.9	
9.5	23.2	11.3		9.1	29.8	54.4		9.5	53 7.7	29.0		9.5	46.4	45.9		9.3	37.3	48.4	
8.9	23.5	3.4		8.5	32.7	44.0	R	9.2	12.8	52.7		9.4	49.3	16.6		8.4	38.0	35.0	K
9.5	41.0	27.6		9.5	45.3	48.6		9.4	25.3	9.1		9.0	4 15.2	43.8		6.4	54.5	4.7	G
7.2	52.3	19.8	K	9.5	43 11.1	53.1		9.5	30.1	53.6		9.2	24.2	52.8		9.5	12 9.1	54.3	
8.9	52.5	54.1		9.4	14.8	16.0		9.4	52.4	55.9		8.5	38.7	51.2		9.0	18.7	25.5	K
9.5	33 16.2	58.2		9.5	16.0	10.6		9.4	53.9	21.7	B	8.8	41.3	36.7		9.5	43.6	18.7	
8.7	36.5	55.2	K	9.0	21.4	4.5		9.5	56.0	23.1	B	9.5	43.9	2.4		9.5	44.5	22.5	
9.2	39.0	42.1		8.4	31.6	52.1	B	8.1	54 8.6	43.7	B	9.5	49.3	55.1		9.0	48.4	7.0	
9.4	48.7	39.2		8.0	39.9	45.5	R	8.1	16.0	30.1	B	9.0	54.3	32.0	K	9.0	50.0	7.1	
9.4	34 12.6	43.9		7.4	55.8	25.2	R	9.5	36.8	32.9		9.5	5 2.7	27.3		9.0	51.8	27.6	K
9.3	23.2	46.9		9.2	44 1.4	56.3		7.5	42.5	21.7	K	9.5	19.6	26.5		9.2	57.9	21.5	K
8.7	30.4	10.3		9.4	10.1	11.3		9.4	45.9	2.0		9.5	32.9	26.5		9.1	13 56.4	16.4	
9.5	53.5	41.5		8.6	14.0	5.9		8.1	55 13.4	59.6	K	9.1	39.0	2.1		8.7	14 23.3	30.2	
9.4	54.6	24.3		8.8	17.2	35.1		9.2	41.5	12.6		9.2	40.9	17.5		8.9	35.2	57.9	K
6.0	59.0	56.5	K	9.2	19.5	47.0		9.4	45.8	7.7		9.4	58.8	30.0		9.0	44.0	59.4	K
9.3	35 1.2	24.3		9.5	31.4	28.3		8.6	53.1	57.4	K	9.4	6 3.7	55.1		8.6	51.2	23.5	
9.0	2.9	6.7		9.2	41.2	17.7		9.5	56 8.7	27.5		9.4	18.0	10.1		9.3	58.6	39.7	
8.8	5.5	16.0		9.5	45 19.4	40.1		9.5	8.9	11.2		9.5	20.5	34.9		9.5	15 3.2	44.1	
9.4	9.2	0.8		9.3	22.7	33.6		9.4	36.4	29.4		9.4	7 0.3	45.1		9.5	37.0	34.6	
9.2	15.1	58.8	B	9.2	35.4	6.1		9.4	39.7	7.0		9.4	5.2	33.2		9.5	40.2	32.0	
8.8	16.0	52.8		9.2	50.0	59.0		8.9	42.6	16.6	K	9.5	11.3	0.0		9.5	41.1	22.4	
9.5	25.9	10.8		8.5	46 6.1	5.6	K	9.5	47.0	53.8		9.5	20.1	38.0		9.4	57.8	23.8	
9.2	34.1	28.5		9.5	9.7	18.5		9.5	47.2	59.2		9.5	23.6	28.9		9.5	16 9.5	54.0	
8.6	35.4	50.0		9.5	16.2	23.4		8.8	51.1	26.0	R	9.5	28.4	46.1		7.8	16.8	31.7	G
9.3	36 0.4	19.6		8.7	47 3.1	52.9		9.4	57 1.3	1.9	B	9.2	8 3.8	31.3	R	9.5	42.9	41.9	
9.3	13.9	32.8		9.0	9.4	36.1		9.3	43.3	59.2		9.3	7.3	38.6		9.2	17 0.3	27.3	
9.5	31.2	35.2		8.8	12.6	40.3		9.5	58 4.0	35.7		9.5	11.2	6.8		9.3	1.9	40.7	
9.5	33.5	8.0		9.5	30.5	41.8		9.5	5.2	20.6		9.5	26.0	35.2		9.4	21.0	50.2	
9.5	36.7	37.2		8.7	33.3	23.2	B	9.5	6.3	58.8		9.0	29.4	14.9	K	9.2	35.2	47.7	
7.8	36.8	55.5	K	8.5	36.3	33.2		9.1	7.8	15.7		8.5	37.4	11.1	K	9.5	41.1	20.8	B
7.4	46.4	0.0	L	8.3	37.8	3.7	B	9.5	32.2	21.2		9.4	50.3	20.3		9.5	41.8	57.2	
8.9	59.7	39.7		9.3	42.1	25.4	B	9.5	38.4	47.5		9.5	58.0	12.9		9.5	54.9	20.4	
9.4	37 25.1	4.1		9.5	53.0	17.5		9.5	59 8.7	19.7		9.5	9 6.2	20.4		9.5	18 1.8	9.4	
9.5	27.8	15.5		8.5	48 23.4	9.1	K	9.4	33.1	39.6		9.5	9.4	19.3		9.3	10.5	7.6	
9.0	39.8	3.5	K	9.0	48.6	55.6		9.4	42.2	59.4		9.5	10.0	34.6		9.3	15.4	41.2	
8.3	46.0	39.0	K	9.0	49 2.0	6.1		9.3	47.8	33.2		9.3	10.9	37.0		9.1	19.2	58.2	
9.0	47.1	7.6		9.5	2.9	30.7		9.5	48.3	44.1		9.3	12.6	38.0	B	9.4	20.5	0.4	
9.5	57.2	57.3		8.9	14.7	55.1		9.4	0 5.4	21.2		8.8	22.0	52.2	K	8.6	23.8	30.9	
9.2	38 3.0	6.9	K	9.5	21.7	5.4		9.4	8.0	38.1		9.5	22.1	3.4		9.5	38.2	20.4	
9.2	3.4	21.3		9.0	29.8	34.6	R	9.5	9.1	31.6		9.1	22.9	44.3	K	9.5	50.7	45.6	
9.5	17.4	11.5		9.4	47.0	48.1		9.5	21.2	5.8		8.2	38.3	21.1	K	9.5	53.3	55.7	
9.5	23.8	37.6		8.3	50 0.0	11.1		9.4	25.2	57.6		9.2	42.2	48.9	K	9.3	54.9	31.1	
9.5	34.6	45.9		9.2	0.1	34.2		9.5	26.7	30.7		9.5	48.3	21.6		8.9	56.6	49.3	
8.3	39 0.0	6.8	K	6.5	13.5	49.0	G	9.3	33.0	37.9		9.5	49.0	45.7		9.3	57.0	3.1	
9.5	1.7	41.0		9.3	14.9	26.4	R	9.5	40.4	22.6		9.5	50.2	25.5		9.4	19 10.6	41.2	
9.5	3.4	37.8		8.2	20.2	59.7	B	9.3	41.2	16.7	B	9.3	10 2.4	11.1		9.3	15.5	6.8	
9.3	11.2	38.5		9.5	49.2	34.1		9.5	55.5	0.4		9.3	8.2	50.7		9.5	24.4	36.2	
8.8	40.8	10.8	K	6.7	57.5	52.2	G	9.5	1 1.3	23.4		9.3	13.4	58.5	B	8.9	32.0	13.9	K
9.5	40 2.0	42.8		9.5	58.2	41.4		9.5	18.9	32.7		9.5	22.5	49.5		9.4	36.0	46.2	
9.5	19.6	51.6		6.5	51 3.0	13.0	K	9.5	27.6	23.4		9.5	28.3	30.0		7.5	49.4	9.6	K
8.5	36.7	54.8		8.3	7.5	34.2	R	9.4	32.0	20.9		9.3	28.3	20.0		9.5	51.0	47.6	
8.6	41 3.8	39.8	K	7.8	29.4	19.8	K	9.3	32.0	39.5	B	9.2	34.1	39.3		9.2	51.4	27.9	
9.3	22.3	9.2		9.5	30.4	29.7		9.5	36.6	39.7		9.5	35.0	52.4		9.5	20 37.3	15.2	
9.5	26.7	20.7		9.0	34.8	22.7	K	9.2	45.4	2.6	B	9.4	50.3	31.8		9.4	38.3	11.8	
9.3	41.6	24.7		9.4	53.4	0.6		9.2	48.0	47.3		9.3	55.3	32.1		7.9	53.3	29.7	G
9.5	46.8	56.0		8.7	52 0.7	45.1		9.5	2 1.1	4.3		9.1	11 5.7	8.5		9.2	21 11.7	53.0	
9.3	47.8	47.8	B	9.5	15.1	16.1		8.9	12.3	45.5		8.4	14.0	4.8	G	8.1	14.2	49.7	B

4101—4160				4161—4220				4221—4280				4281—4340				4341—4400			
	21ʰ	+42°			21ʰ	+42°			21ʰ	+42°			21ʰ—22ʰ	+42°			22ʰ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.6	21 29.4	36.4	G	9.4	32 0.7	27.3		9.3	43 46.0	25.7		9.3	57 0.3	50.9	K	8.0	10 11.7	47.8	K
9.0	30.1	38.9		9.1	9.9	19.3	K	9.4	49.0	27.7		9.1	3.0	45.6	K	8.2	25.6	27.8	K
9.5	41.5	0.1		8.9	24.8	18.8		9.4	50.2	34.2		9.4	7.4	18.6		8.4	29.5	7.2	
9.4	47.0	43.9		7.7	48.6	38.7	K	9.5	44 2.2	59.8		9.4	16.9	12.1	B	9.5	31.5	13.3	
9.5	22 10.1	25.0		9.1	55.4	18.7	K	9.1	4.8	30.7	B	9.5	19.7	49.4		9.0	35.4	28.9	K
9.1	14.0	47.9		9.2	56.7	43.8		7.8	24.0	12.0	K	9.5	29.0	8.1		9.5	45.7	48.1	
8.3	28.6	26.9	G	9.4	33 3.0	6.5		9.5	38.3	53.2		9.5	33.9	49.3		9.5	11 4.9	47.7	
9.5	33.7	45.1		9.5	10.4	8.4		9.5	59.0	35.9		9.5	51.2	26.9		8.0	36.1	3.7	K
9.0	46.4	12.2		8.7	10.6	47.1		9.4	59.7	24.5		9.5	58 1.7	2.1		9.5	12 2.7	32.9	
9.2	55.4	0.9	K	8.3	17.0	56.1		8.7	45 20.7	9.9	K	9.5	33.0	3.8		9.5	20.8	8.4	
9.5	23 7.1	13.1		9.5	24.7	23.4		9.5	31.8	46.3		9.3	47.6	35.2		9.5	42.1	13.3	
9.3	29.4	42.4		8.4	47.9	37.4	B	9.1	35.2	50.3	B	9.4	59 15.8	7.8		9.2	47.6	16.2	
9.1	30.0	31.3		9.4	34 2.5	3.0		8.3	53.9	27.5	B	9.1	20.7	41.7		9.5	13 5.9	33.5	
9.5	24 1.9	29.1		9.1	6.5	24.3		8.5	46 16.6	4.0		9.1	21.5	25.3	B	8.5	12.8	34.5	
9.5	4.2	35.2		9.5	15.6	59.8		9.2	47 12.5	57.7		9.4	23.6	31.5		9.1	25.8	54.0	
8.7	14.0	54.1		9.5	22.7	6.1		9.4	26.2	43.2	B	9.4	47.0	0.2		9.5	52.1	21.6	
9.4	25.0	41.9		5.2	29.7	37.2	K	9.4	28.7	43.9		9.4	47.0	16.1		9.5	52.3	15.1	
9.2	27.5	8.6		9.0	35 14.8	19.4	K	9.5	35.5	5.8		8.5	58.7	50.3	K	9.5	14 28.5	25.1	
9.5	44.8	54.3		9.0	32.2	16.5		9.5	36.5	2.3		9.4	0 6.5	41.8		9.5	15 4.6	43.6	
9.5	48.7	51.2		9.5	47.5	44.6		9.2	51.8	52.9	B	9.5	31.8	47.6		9.5	5.2	24.5	
8.3	25 28.4	28.2		9.0	55.4	34.9		8.8	55.1	48.0	B	8.5	37.1	41.0	K	9.5	15.0	21.2	
9.5	41.0	42.5		9.1	55.7	26.5	B	9.3	48 7.6	16.0		9.5	1 0.2	15.5		9.5	29.2	20.7	
7.1	59.9	4.2	K	9.5	36 9.5	44.9		9.1	10.5	17.9	K	7.5	48.8	13.7	K	9.1	40.1	10.5	
9.5	26 3.3	14.1		9.1	25.5	9.7	B	9.2	16.2	25.8		8.0	2 14.8	38.5	K	9.1	41.1	5.9	
9.2	24.4	37.1		9.4	35.7	12.7		9.5	18.7	34.5		9.0	52.7	4.7	K	8.3	44.5	29.0	K
9.1	32.2	17.5		9.2	39.1	54.4	B	8.0	44.6	33.5		9.3	3 22.9	44.8		9.5	45.7	52.3	
9.5	27 0.9	9.5		9.0	47.8	0.2		8.3	49 5.7	38.9	K	7.5	43.4	55.7	L	8.6	47.2	37.6	
9.1	22.8	8.3		8.0	52.2	20.3	K	8.6	12.0	13.0	B	9.4	44.9	29.7		9.5	16 7.8	41.1	
9.3	28.7	56.0		8.8	54.5	35.3		8.0	12.2	33.6	K	7.6	45.1	28.0	G	9.5	18.5	5.5	
9.0	33.5	48.5	K	8.3	37 26.8	55.3		7.5	25.8	29.2	K	9.3	54.8	11.2	B	9.0	31.5	13.5	
9.4	37.1	27.2		9.5	32.1	4.0		9.3	39.2	20.0		9.4	4 7.8	12.9		8.8	38.1	41.1	
9.5	49.7	33.1		9.4	58.7	28.3		9.5	50 4.0	38.3		9.5	20.7	25.6		9.5	46.9	32.7	
9.2	51.8	29.6		9.0	38 10.7	30.7		9.5	7.6	38.8		9.5	22.4	9.7		9.5	49.6	40.1	
9.2	52.0	44.6	K	9.5	27.2	18.6		8.5	13.6	37.6	K	8.0	41.9	1.3	K	9.0	50.2	28.3	K
8.3	52.2	19.6	K	8.5	39 3.8	46.6	K	9.0	26.9	8.6		6.7	5 2.0	18.7	K	8.9	17 11.7	28.5	K
9.3	28 10.1	3.6		8.8	7.3	25.5		7.3	51 48.7	33.5	G	9.4	2.2	23.5	B	9.5	20.9	18.7	
9.3	25.5	12.1	B	8.5	30.7	40.0	K	7.5	52 10.7	27.9	G	9.4	5.0	57.1		9.4	26.4	21.2	
8.8	49.1	16.6	K	8.5	33.6	37.2	K	9.2	16.1	15.7	B	7.0	8.5	49.0	L	9.5	47.0	1.7	
8.8	29 0.4	43.6		9.5	35.7	15.5		9.5	20.2	8.9		9.5	23.4	52.0		8.5	49.6	34.7	K
9.3	8.7	2.4		9.5	50.9	59.7		7.0	20.9	32.8	G	9.5	30.0	52.2		8.0	50.8	48.8	K
9.5	23.4	48.1		8.3	40 10.9	33.8	K	8.4	27.6	49.7		9.2	31.5	44.7		9.5	54.5	40.1	B
9.3	27.5	24.8		8.8	13.5	57.0		9.5	57.3	26.2		9.3	40.6	20.0		9.5	18 0.0	24.3	
9.1	28.6	31.9	K	8.5	28.2	13.4	K	8.9	53 34.2	9.4		9.5	6 21.5	38.3		9.3	1.4	21.8	B
9.5	32.5	16.8		6.5	32.6	23.2	K	8.8	46.2	29.4		9.5	40.1	25.7		9.5	4.9	23.1	
9.5	33.1	9.7		9.5	39.0	35.5		9.5	52.8	51.7		9.4	7 16.0	5.9		9.5	5.5	58.9	
9.3	42.1	26.9		9.0	39.0	5.0		8.7	55.0	5.9		9.5	17.9	19.0		9.4	10.5	34.5	
9.5	51.7	21.4		8.0	41 18.2	38.7	L	8.5	54 31.0	45.2		9.5	18.0	23.5		9.3	21.4	51.2	
9.0	30 2.8	12.5		8.9	29.7	40.6		8.7	36.3	22.3	K	9.5	18.2	52.0		9.4	22.0	59.8	
9.5	5.0	7.1		9.0	35.4	16.1		9.5	56.3	47.6		9.0	19.7	39.4	K	9.2	24.1	36.7	
8.5	20.8	35.8	K	8.6	45.1	4.7	K	7.2	55 2.0	55.8	L	9.3	37.6	5.1		8.9	32.1	6.4	
8.0	31.9	14.5	K	9.1	45.5	16.1		9.1	32.2	59.6		9.5	51.9	2.2		9.3	32.3	36.7	
9.0	33.4	1.1	K	9.5	42 4.8	16.8		9.5	51.8	43.2		8.1	8 23.9	56.7	L	9.5	19 27.1	32.1	
9.3	48.3	56.1		9.5	37.7	54.5	B	8.5	59.8	39.5	K	6.0	40.0	14.0	G	9.2	41.2	50.8	
8.5	49.4	40.2	K	9.1	45.9	4.1		9.4	56 1.6	32.0		9.3	49.5	44.0		9.3	50.1	43.0	
8.6	53.9	24.6		9.1	49.2	13.4		9.0	5.3	27.5		9.4	52.3	0.4		8.4	20 2.6	7.9	K
9.1	31 0.7	19.1		9.2	43 0.6	23.5		9.3	8.6	0.2		9.5	9 13.1	40.0		9.0	4.2	24.2	
9.5	9.2	40.4		9.3	12.2	15.1		8.7	24.2	9.1		9.4	26.7	15.4		9.0	14.0	48.0	B
9.5	32.1	48.3		8.8	16.8	7.9		9.5	35.8	41.4		9.5	29.3	53.6		9.2	16.9	47.2	
9.5	32.8	54.8		9.3	19.1	0.3	B	9.5	43.8	41.7		9.1	50.4	48.4		9.5	37.6	57.6	
9.5	48.3	9.2		9.2	38.2	17.9	K	6.8	47.9	7.2	G	9.4	10 5.2	54.6		8.8	41.2	17.3	K

4401—4460				4461—4520				4521—4580				4581—4640				4641—4700			
	22ᵘ	+42°			22ᵘ	+42°			22ᵘ	+42°			22ᵘ—23ᵘ	+42°			23ᵘ	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	20 50.4	35.6		9.1	31 7.2	51.8	K	5.0	45 31.0	30.8	K	8.4	59 50.0	11.2		9.2	13 0.8	44.9	K
8.7	21 3.2	31.5	K	9.4	10.0	8.6		9.3	51.7	24.4		8.5	0 25.6	8.8	K	8.2	21.9	23.0	K
9.5	21.1	5.3		9.5	48.5	3.3	B	9.5	46 27.0	40.7		9.5	39.7	7.3		9.3	26.6	34.9	
9.5	39.0	2.3		9.5	32 34.9	39.0		8.3	35.3	15.8		7.8	44.7	36.3	K	9.4	33.9	47.8	
9.2	42.5	21.1		8.8	45.5	13.7		9.5	46.2	35.1		9.5	1 16.8	29.7		9.4	14 8.2	58.1	
9.5	45.4	8.0		9.4	49.3	52.5		9.5	59.1	28.2		8.9	31.7	26.0	B	9.3	12.4	12.9	
9.0	58.2	20.9		9.0	33 2.8	7.8	B	8.5	47 3.3	53.0	K	8.3	42.2	9.5		9.5	26.8	54.4	
9.5	59.0	32.0		9.5	13.6	34.0		9.5	24.8	6.2		8.3	44.3	44.0	L	9.4	36.7	9.1	
9.5	22 4.7	7.8		9.5	25.2	5.0		7.8	50.8	45.8	K	9.0	52.6	36.7		9.5	59.1	34.0	
9.5	20.3	14.4		9.5	53.9	52.8		9.4	57.1	44.1		8.9	3 15.6	4.3	K	9.4	15 4.0	42.2	
9.5	52.2	34.7		9.2	34 6.6	15.2		9.2	48 0.6	48.6		8.9	16.0	2.7	K	9.3	20.9	41.6	
9.5	23 16.8	42.5		9.4	8.7	0.8		9.4	6.8	18.1		6.0	47.3	46.8	K	9.1	51.3	1.9	
9.2	23.0	57.9		9.2	13.6	18.1	B	9.4	16.5	36.5		9.5	4 2.2	0.4		9.5	56.7	30.7	
9.4	27.1	36.5		8.0	22.3	43.5		9.5	33.6	32.3		7.5	19.3	52.7	K	9.0	16 4.8	59.4	
9.0	29.2	22.5	K	9.2	22.8	34.1		9.5	48.2	18.8		9.2	25.4	9.6		9.4	8.6	57.2	
9.5	32.1	4.4		9.3	25.5	50.4		8.1	58.8	31.0	L	9.0	25.4	3.1		9.0	11.4	44.7	K
8.0	54.4	7.3	K	9.3	56.8	22.0		9.5	49 3.2	34.8		9.5	5 1.1	28.3		9.1	15.4	44.0	K
9.4	56.5	16.2		9.5	35 1.5	51.0		7.5	16.7	48.3	L	9.5	30.0	16.1		8.8	24.8	18.1	
8.7	24 13.7	46.9		9.5	26.1	24.0		8.5	16.7	25.5	B	9.5	49.3	54.4		9.5	34.1	33.4	
5.0	14.3	22.7	K	9.5	36.5	7.0		9.0	29.0	30.8		9.0	49.7	45.4		8.8	48.7	21.4	
9.5	25.7	3.5		9.0	39.9	51.8		8.9	44.1	55.8		9.5	50.0	3.4		9.5	17 21.9	8.4	
9.5	32.8	13.0		9.4	36 14.0	6.9		9.3	50.5	0.4		8.7	6 23.7	58.0		9.4	58.6	7.8	
8.2	39.7	40.8	K	9.5	22.3	47.3		9.4	52.2	24.8		9.5	33.8	41.4		8.6	18 11.3	37.4	
9.4	45.8	9.8		9.4	27.0	59.0		9.5	54.2	20.3		9.0	37.5	49.4	B	9.4	32.3	58.9	
9.5	25 10.6	6.9		9.5	35.0	0.3		8.0	54.9	14.3	K	8.7	52.5	26.2	K	9.1	43.2	15.3	K
9.5	28.6	38.1		9.3	37 3.7	16.6	B	9.3	50 0.0	2.3		9.0	7 22.8	29.4		8.9	58.7	31.0	
9.1	28.9	35.6		8.8	12.8	11.9	K	9.1	23.5	30.3		7.9	35.7	40.6	K	8.9	19 7.2	17.1	K
9.4	29.3	28.2		8.5	23.0	7.8	K	6.8	52.1	14.0	K	7.4	38.2	54.6	K	9.5	8.1	36.7	
9.1	29.6	33.2	B	9.5	38 36.7	4.5		9.4	51 0.7	8.5		9.4	42.3	18.2		9.4	21.4	16.9	
9.5	30.4	53.3		9.5	43.0	8.3	B	9.4	6.3	11.7		9.5	49.2	50.7		9.1	29.4	14.6	K
9.3	59.0	40.9		9.2	43.1	55.2		9.1	14.6	49.0		9.2	53.1	21.8		9.0	20 4.5	37.6	K
9.1	26 0.4	1.0		9.5	44.0	6.3		9.5	22.7	14.0		9.5	8 7.2	39.6		6.2	9.6	7.1	G
9.5	0.9	22.3		8.7	53.2	44.6	B	9.5	44.6	50.0		9.5	13.0	12.7		9.5	14.7	49.2	
8.7	7.1	32.5	K	9.4	54.2	14.0		9.5	45.1	55.9		9.2	15.7	32.6	K	9.5	23.4	15.3	
9.5	11.0	0.6		9.4	39 4.0	52.6		9.1	52 12.2	26.1		8.5	16.7	30.9	K	9.4	39.3	0.6	
9.5	15.8	40.2		9.5	41.3	46.9		8.9	17.6	42.0	K	9.5	47.3	58.2		8.1	49.4	21.6	B
9.1	22.7	22.0		7.6	47.6	6.5	K	8.8	19.8	35.4		9.4	9 17.0	4.3		8.5	59.1	51.0	K
9.5	56.6	21.7		9.5	48.7	52.5		9.0	22.2	0.6		9.4	30.5	24.3		9.5	21 2.5	7.6	
9.5	27 6.2	28.3		8.3	52.6	35.3	K	9.5	42.3	5.5		9.5	45.6	27.2		9.4	4.8	12.8	B
9.5	21.8	24.4		9.5	40 52.2	55.5		9.4	53 4.2	55.6	B	9.4	52.8	2.3		9.5	5.1	27.5	
7.8	27.0	44.2	K	9.1	41 22.1	53.1	K	9.4	8.3	35.1		9.5	56.1	5.1		9.1	17.8	43.9	K
9.5	32.1	33.0		9.1	25.5	49.3	K	9.1	38.7	1.6		8.9	10 4.2	6.8		9.5	47.8	0.7	
9.5	46.5	21.9		9.5	47.1	0.9		9.5	56.9	23.0		9.5	6.0	44.7		9.4	48.5	37.1	
9.5	54.7	55.1	B	9.2	42 13.6	9.0		9.5	54 17.2	11.9		9.5	26.1	50.3		9.1	22 4.1	5.0	
8.7	58.9	55.8	K	9.1	43 7.5	45.5		9.1	23.9	29.6		9.5	30.2	1.9		9.1	6.6	35.4	K
9.4	28 53.1	54.3		9.2	27.6	49.0	B	9.4	55 21.3	15.5		9.3	51.2	0.4		9.5	47.5	18.9	
7.9	29 0.1	56.1	K	9.0	34.9	45.2		9.3	28.0	21.8		8.0	11 0.8	45.9	L	8.4	49.7	4.5	K
9.5	1.5	30.5		9.4	36.6	33.4	B	9.5	31.5	11.3		9.5	23.7	45.4		9.0	23 30.1	44.6	
8.6	17.5	22.4		9.4	36.6	50.0		9.3	56 16.8	5.7		9.5	31.0	24.0		8.6	56.0	38.0	
9.2	28.2	34.2		9.4	37.6	48.2		9.5	41.7	16.8		9.5	51.2	13.1		9.0	59.0	28.2	
9.3	37.1	54.8	K	9.5	57.7	30.9		9.3	53.6	31.1	B	9.1	58.7	7.8	B	9.0	24 0.9	28.2	
9.5	39.6	47.5		9.0	44 22.5	14.0		8.3	56.2	56.8	K	8.3	12 6.2	42.6		8.0	23.0	34.4	B
8.5	30 25.4	48.3	K	9.5	22.8	57.3		9.5	57 17.2	0.1		9.2	14.7	1.6	B	9.2	41.0	22.6	K
9.3	33.1	11.6		7.7	36.5	29.0	L	9.4	18.5	8.8		7.5	16.8	19.9	K	9.4	25 8.1	37.6	
9.4	37.0	23.8		9.5	47.1	28.2		9.5	31.3	21.6		9.3	16.9	3.7		9.0	12.0	31.0	
8.1	40.0	49.4	K	9.3	47.7	8.0		9.5	58 5.6	25.2		9.5	27.5	55.5		8.9	14.2	21.0	K
6.7	54.2	4.3	L	9.0	48.6	51.4		8.0	51.2	27.9	K	9.0	30.6	37.5		8.2	31.2	24.5	K
8.9	56.9	56.4	K	9.4	45 11.3	24.0		9.5	59 19.0	11.5		9.5	48.6	41.6		9.3	38.0	19.9	
9.3	31 0.8	38.6		9.5	21.5	56.1		9.5	29.0	22.3		9.4	50.0	47.6		8.7	26 5.2	17.3	K
8.8	3.9	25.6		9.3	26.0	14.7		9.5	42.5	58.1		7.5	13 0.5	9.9	L	7.0	19.3	2.2	L

4701—4728				4729—4756				4757—4784				4785—4812				4813—4838			
	23u	+42°			23u	+42°			23u	+42°			23u	+42°			23u	+42°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	27 13.0	58.7		9.5	33 28.8	29.4		9.0	39 11.8	51.7		9.1	45 35.9	6.7		8.8	53 48.1	12.2	K
9.2	15.0	53.0		9.5	34.1	22.7		9.4	31.9	38.0		9.1	37.8	32.5		8.9	53.3	23.0	
9.3	18.2	2.7		9.2	45.7	56.2		8.4	39.6	52.4	K	8.1	46 12.5	51.0	K	9.3	54 44.5	36.5	
9.5	44.3	36.8		9.1	50.2	45.5		8.6	59.9	45.0	K	9.4	42.6	38.5		9.3	52.1	47.8	
9.5	46.8	39.2		9.5	55.4	19.7		9.5	40 0.4	48.0		9.5	46.0	8.4		7.3	55 17.9	6.8	K
7.5	48.7	24.7	L	9.5	34 1.2	40.5		8.6	45.9	55.3		9.5	47 27.2	33.0		8.3	26.6	43.1	
9.5	28 1.8	55.2		9.2	2.5	38.4		9.5	51.4	25.8		9.5	48 5.5	10.2		7.5	45.3	49.8	
9.3	7.6	25.3		9.1	7.3	59.0	K	8.5	56.7	18.5		7.8	20.1	29.3	R	9.5	48.5	55.8	
8.9	21.5	36.0		9.5	16.9	28.5		8.9	41 12.6	47.0		9.5	49 53.0	56.1	B	9.1	56 23.3	54.5	
9.4	34.6	54.9		9.1	37.4	41.9		9.5	19.1	48.5		9.4	50 13.1	9.5		9.2	49.9	4.6	
9.1	45.4	36.0		9.0	52.9	23.5	K	9.3	28.8	29.0		9.5	13.6	34.7		8.6	56.1	47.9	
9.5	29 18.8	59.8		9.4	35 15.4	29.4		9.5	39.7	4.5		9.3	36.5	50.0		9.4	57 0.5	48.1	
9.2	43.6	7.2		8.3	51.1	25.8	K	8.7	48.1	46.7		9.3	38.6	56.6		9.0	1.8	44.8	
7.8	47.8	30.8	K	8.2	36 0.9	32.1	K	9.3	42 28.7	33.1	R	9.3	44.8	52.4		9.1	6.0	56.0	
8.7	30 23.9	48.9		9.5	13.8	21.8		9.5	44.8	26.3		9.3	45.3	58.9		8.4	9.1	45.2	K
8.2	24.5	54.6		9.4	34.7	25.2		9.4	51.6	6.2		9.5	52.4	17.6		9.5	16.5	3.3	
8.9	41.4	49.3		8.5	37 7.8	20.1	B	9.5	53.4	49.6		9.5	51 1.3	13.1		9.3	19.5	25.7	
9.2	48.6	36.0		9.1	30.1	17.4		8.8	43 10.4	41.7	K	9.5	19.2	53.9		9.4	58 4.9	41.8	
7.5	58.7	16.0	K	6.6	34.7	56.2	K	9.4	14.0	5.1		8.4	41.6	9.3		8.5	10.4	35.4	K
4.2	31 3.0	28.0	G	9.5	52.3	26.2		7.5	16.0	36.8	K	8.8	45.6	24.1		9.1	25.9	15.2	
9.5	6.9	6.8		9.5	54.5	10.2		7.7	44 2.5	41.8	K	8.9	54.2	40.3		9.5	41.0	46.4	
9.5	22.6	10.0		9.5	38 6.8	33.7		9.4	19.5	21.3		9.0	52 10.0	31.6		9.0	59 6.3	57.7	
9.5	24.1	40.2		9.3	50.1	24.7		9.5	31.6	15.9	B	9.5	11.6	3.7		9.5	8.1	47.8	
9.4	42.7	19.9		9.5	54.0	5.8		7.0	35.6	5.6		9.5	46.7	35.8		9.5	8.4	40.2	
9.5	32 27.4	10.0		9.3	55.7	35.6	B	9.5	40.2	45.8		9.5	53 0.1	29.9		9.3	10.7	38.1	
7.5	30.8	31.8	K	9.3	57.0	8.3	B	7.9	52.4	42.5	K	9.5	5.9	8.8		9.2	28.2	2.7	
9.5	32.4	10.8		9.5	58.0	38.9		8.7	55.5	37.7	K	9.3	24.6	37.5					
9.5	59.0	43.5		9.3	39 0.0	13.5		9.2	45 2.0	39.0		9.0	45.3	6.1	K				

Zone +43°

1—40				41—80				81—120				121—160				161—200			
	ou	+43°			ou	+43°			ou	+43°			ou	+43°			ou	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	0 10.7	44.7		9.5	9 48.6	29.9		9.4	18 24.0	35.8		9.3	29 39.8	20.3		8.9	42 49.4	41.6	K
8.8	18.9	16.4		9.1	52.4	44.9		9.0	29.6	31.8	B	8.3	30 29.6	12.7	K	9.5	56.5	46.0	
9.2	26.6	59.5		7.3	10 2.1	55.9		8.9	39.2	1.7	K	9.5	43.4	0.6		9.5	43 16.4	39.0	
8.8	29.4	46.2	K	8.1	8.3	12.0	K	8.6	55.3	14.0	K	7.9	31 3.8	52.3	K	8.7	23.7	7.6	K
9.5	43.0	1.9		7.0	16.3	45.5	K	9.5	19 0.8	55.5		8.7	10.4	5.9	K	7.8	30.9	25.6	K
9.5	1 20.2	29.2		9.5	30.0	46.7		9.5	31.1	43.4		9.2	10.9	12.8		9.3	45.5	4.8	
8.1	39.3	55.1		6.5	44.2	45.9	K	9.5	46.0	54.1		9.3	17.8	18.8		9.5	58.9	56.0	
9.4	47.1	5.3		9.3	48.1	11.7		9.5	20 0.0	58.5		9.5	20.0	28.1		9.2	44 28.0	57.7	K
9.5	2 4.0	57.0		6.8	11 3.8	50.6	K	9.4	5.7	9.2		9.5	51.4	36.3		9.5	40.0	28.4	
8.8	31.1	17.2	K	9.5	24.0	18.1		9.2	15.3	58.7		9.5	32 23.3	3.8		9.5	49.9	13.2	
9.5	3 10.3	58.0		9.4	25.5	58.6		9.5	24.6	19.2		9.5	36.5	56.1		8.5	53.1	9.6	K
9.2	38.9	29.6	K	9.4	48.5	4.9		5.5	27.1	36.6	K	9.5	33 19.4	28.7		9.5	59.0	8.6	
9.3	42.1	41.7	K	8.2	12 15.4	54.3	B	9.5	21 39.7	39.8		9.1	40.9	56.5		9.4	45 13.5	6.2	B
9.4	48.3	10.5		7.8	29.0	8.1	K	9.3	55.1	39.5		9.3	58.0	41.9		9.1	32.2	16.0	K
9.4	49.5	21.7		9.2	34.1	36.5		9.5	22 28.1	20.7	B	7.0	34 25.7	8.2	K	9.2	51.4	17.4	K
8.5	4 10.3	58.3	K	9.5	13 5.4	56.4		9.5	23 17.6	42.0		9.3	43.9	59.7		9.5	46 3.8	38.8	
9.3	28.5	55.2		9.2	7.8	57.6		6.7	24.5	9.2	K	9.1	35 0.4	17.3		9.5	47 1.0	2.7	
8.0	44.6	0.8	K	9.0	27.4	43.4	K	9.5	24 4.1	52.9		9.5	7.3	54.3		9.3	54.9	37.0	
9.4	47.4	33.7		9.5	47.3	40.2		8.3	37.2	3.0	G	9.0	30.4	3.9	K	9.2	57.5	53.8	
6.5	5 0.5	54.7	K	9.2	52.0	36.8	K	9.5	25 4.6	55.0		9.5	33.9	44.6		9.1	48 30.2	48.8	
7.3	1.6	47.8	K	9.3	14 10.0	9.1	K	9.3	14.9	13.4		9.5	37 16.0	13.9		9.2	39.5	42.1	
7.0	2.6	31.2	K	9.5	18.3	53.1		9.5	43.1	25.5		9.4	16.9	5.0		8.4	40.3	24.2	
9.5	43.3	7.8		9.5	21.2	24.3		9.5	26 15.4	9.8		9.4	25.0	21.4		8.8	44.4	40.8	B
9.0	6 3.2	23.2	K	9.2	46.1	57.7		8.3	16.5	1.8		8.2	35.8	5.4	B	9.1	46.5	40.1	
9.4	20.0	34.4		9.5	15 2.9	3.3		9.2	16.6	47.7		9.1	38 9.2	46.4	R	9.4	49 18.4	31.6	
8.7	22.4	37.9	K	9.5	18.6	3.6		9.5	34.2	49.5		7.5	28.4	29.7	K	9.5	38.2	50.2	
9.2	23.1	35.6		7.0	22.8	43.3	J	9.5	27 4.4	50.4		8.3	34.8	2.1		8.3	54.7	4.3	K
8.2	28.1	42.0	K	9.5	37.2	9.7		8.9	17.2	38.2	K	9.5	43.2	46.0		9.3	50 30.4	5.3	
9.5	38.0	11.1		9.2	45.6	14.4		8.7	28 8.1	14.1		9.5	48.4	11.4		9.1	51.3	2.7	K
9.5	44.5	26.8		9.2	52.4	41.2		7.0	28.6	51.1	K	9.4	39 11.4	17.0	R	9.4	51 6.9	33.6	
8.0	50.6	2.4	K	9.0	16 18.0	22.7		9.5	35.3	3.9		9.5	15.5	28.4		9.5	48.7	7.6	
8.4	7 9.7	59.8		6.5	24.1	27.8	G	9.3	46.8	17.0		8.8	25.0	52.1	K	8.8	51.8	4.1	K
6.7	43.0	23.3	G	9.4	17 7.8	24.1		5.4	54.1	41.4	K	9.5	57.9	39.8		6.2	52.9	55.4	K
9.3	46.6	53.7		8.6	41.0	31.0	G	9.5	29 0.3	37.2		9.4	40 10.7	23.2		9.5	52 27.7	39.4	
9.5	8 4.1	37.7		9.5	45.1	54.3		9.5	11.3	39.0		8.9	11.2	4.6	K	9.5	30.4	24.2	
9.5	31.6	54.0		9.4	49.0	25.7		9.5	19.9	25.2		7.7	41 5.0	22.9	K	9.5	44.2	5[illegible]	
9.5	42.6	16.8		8.8	18 2.3	45.1		9.5	21.1	29.2		9.5	10.5	56.3		9.5	44.5		
9.4	9 10.0	26.0		9.3	10.4	29.3		9.5	27.5	35.5		9.5	20.9	45.6		9.1	53 27.4		
9.5	11.8	31.6		9.4	17.6	16.4		9.5	28.9	24.9		7.5	33.6	16.6	L	8.5	37.0		
9.1	14.3	38.5		8.5	20.6	22.4	B	9.3	32.0	59.3		9.1	42 7.0	27.4		9.0	40.9		

201—260				261—320				321—380				381—440				441—500			
	0ʰ—1ʰ	+43°			1ʰ	+43°			1ʰ	+43°			1ʰ—2ʰ	+43°			2ʰ	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	53 49.4	4.8		9.3	9 7.9	37.0		9.3	25 3.9	51.7		9.5	42 25.6	17.8		9.4	2 19.4	58.2	
9.5	55.4	12.2		6.9	17.4	51.4	K	8.8	22.9	31.9		9.4	35.7	4.3		9.0	27.8	10.1	K
9.4	54 2.4	1.8		9.4	58.4	30.4		8.1	29.8	20.4	K	8.8	49.9	20.8		9.5	3 8.0	58.4	
9.4	28.6	16.3		9.5	58.7	13.8		9.5	26 4.0	8.7		9.1	43 7.7	12.1	K	9.3	19.1	49.4	K
9.5	55 13.8	36.1		9.5	10 35.9	22.1		8.4	8.7	2.6		9.5	28.8	47.1		9.2	39.1	40.5	K
8.5	27.9	17.6	L	9.5	38.3	44.6		9.4	47.9	40.8		8.7	44 33.7	54.0	K	8.3	52.7	9.5	K
9.3	38.7	20.0		8.5	50.2	50.3	K	9.5	55.5	56.0		9.5	57.9	9.0		5.2	4 10.1	32.9	K
9.5	44.0	58.5		9.5	58.3	44.6		9.5	27 16.8	10.2		9.5	45 18.8	19.8		9.5	14.9	10.4	
9.4	47.4	26.3		9.0	59.9	41.2	K	9.5	42.9	41.9		9.4	48.4	42.3		9.5	16.9	40.9	
9.0	52.5	33.2		9.5	11 0.6	3.4		9.5	46.7	56.9		9.5	46 4.4	34.0		9.3	54.3	58.9	
9.1	56 9.9	4.5		9.5	5.8	10.6		9.0	28 5.3	31.9		9.5	24.6	1.1		8.8	5 12.0	54.0	B
9.5	10.9	25.9		9.5	20.9	32.5		9.0	10.4	1.5	K	9.5	30.0	29.5		9.5	42.7	47.8	
8.8	11.5	41.5		8.0	43.1	11.5	L	9.0	12.5	32.2		9.5	47 0.7	39.1		9.5	52.6	16.0	
9.4	39.8	1.5		9.4	12 0.6	12.0		9.5	39.1	5.8		8.8	10.1	24.0	K	9.0	6 13.6	1.7	K
9.5	44.0	26.6		9.5	57.9	26.0		9.0	29 3.4	24.6		9.3	49.2	12.0		9.4	33.7	54.0	
8.7	50.6	14.1	B	9.5	13 18.3	53.2		8.8	19.7	46.7		8.5	48 0.9	28.8	K	9.5	51.6	1.2	
8.7	54.3	6.7		8.7	41.7	4.0		7.5	59.9	24.2	K	9.2	1.0	38.7	B	8.9	7 18.4	46.0	
8.8	57 0.2	48.7	B	9.5	14 13.7	29.9		9.5	30 10.0	53.3		9.5	5.4	10.5		9.5	39.7	27.0	
9.1	20.3	23.1		9.5	15.6	24.4	B	9.4	20.1	13.7	K	9.1	12.9	22.2	K	7.7	41.9	6.3	K
9.4	48.4	28.7		9.3	17.7	51.6		9.3	20.8	5.5		9.5	40.0	29.1		9.0	50.9	53.9	K
9.5	58 10.0	59.2		8.5	15 23.4	48.5		8.8	27.4	17.3	K	8.0	45.4	50.6	K	9.5	8 20.8	41.6	
9.5	17.0	59.1		9.5	32.6	12.1		9.4	38.7	49.1		8.4	49 23.9	3.1		9.5	37.2	37.5	
9.5	21.0	45.6		8.5	32.7	4.8	K	5.0	42.0	37.2	K	9.5	45.4	57.8		9.4	9 7.0	6.2	
9.5	28.3	10.5		9.5	16 23.8	10.6		9.5	31 22.4	22.8		9.4	50 50.7	20.8	B	9.5	43.2	59.3	
9.5	37.0	48.7		9.5	25.5	49.5		9.5	54.5	15.2		9.1	51 14.2	44.4	K	9.5	48.1	30.6	
9.5	48.2	24.9		8.9	46.6	25.3	K	9.5	32 10.0	12.0		7.0	19.4	43.0	K	9.3	51.3	37.4	
9.5	52.0	47.5		8.9	49.7	18.1		9.4	35.8	50.7		7.3	25.7	22.9	K	9.5	55.7	20.4	
9.5	58.0	56.9		9.2	17 9.4	17.0		9.2	54.3	39.2		9.5	31.2	52.3		9.5	58.0	33.4	
7.7	58.1	50.7	K	9.5	31.4	36.5		9.5	33 49.7	50.4		9.5	52 9.3	38.5		9.5	10 0.1	22.5	
9.0	59 9.4	18.0		9.5	39.4	36.5		9.3	34 13.3	12.0		9.5	17.2	47.2		9.5	11 1.4	2.0	
9.4	19.9	59.3		8.8	42.9	47.4	K	9.3	36.7	46.5	B	9.5	28.7	32.2		9.3	37.9	9.0	K
8.8	30.1	27.9	B	9.5	50.8	40.7		9.5	35 8.1	17.1		9.4	53 21.7	55.1		9.3	38.9	41.9	K
9.5	34.0	33.9		9.5	53.8	40.4		9.5	41.3	43.7		9.5	26.6	16.8	B	9.3	12 18.0	6.3	
5.2	42.7	10.5	K	8.6	55.9	35.4	L	9.5	36 3.7	59.1		9.3	54 25.7	9.5		6.5	24.0	55.6	K
9.3	0 0.4	53.3		9.3	18 4.8	47.1		9.3	9.1	17.5		9.1	55 12.7	3.2		7.8	39.1	9.0	
9.4	2.4	21.1		9.5	12.3	50.3		9.3	10.0	29.1		9.5	23.6	46.0		9.3	39.1	3.6	
9.5	1 24.9	19.4		9.2	25.4	12.1		8.8	13.2	9.2		9.5	43.8	39.1		9.5	46.7	44.8	
9.5	41.2	2.4	B	9.5	46.6	28.7		9.3	46.3	21.7		9.5	47.9	22.9		8.0	52.4	36.4	L
9.0	59.4	44.3		9.5	19 3.9	53.6		9.3	50.8	47.5		9.5	56 10.4	0.3		9.5	13 24.2	43.7	
9.5	2 17.7	15.3		8.6	21.4	46.0		9.4	53.7	34.2		8.6	17.7	31.8	K	9.5	50.5	17.1	
8.5	17.8	0.5		8.0	36.1	7.6	K	9.4	37 4.6	7.7		8.6	17.8	25.7	K	9.0	57.1	55.8	
9.5	20.0	19.1		6.5	41.1	17.9	G	9.5	20.8	12.8		9.2	24.9	16.7		8.2	14 11.2	42.3	K
9.4	35.5	56.2		9.5	41.4	57.8		9.4	23.6	6.5	B	8.9	27.4	8.6	K	9.3	18.7	50.9	
9.4	40.8	58.2		9.2	47.9	9.4	K	8.5	32.7	55.1	B	8.6	29.4	29.4	K	9.5	21.2	42.5	
9.5	3 17.4	36.7		8.8	20 21.5	31.8	K	9.3	47.1	7.0	B	9.4	50.5	51.6		9.5	46.7	16.1	
9.4	35.0	59.4		8.8	21 47.4	7.4		9.5	38 58.8	20.8		9.2	57 48.7	9.0		9.5	50.0	8.8	
9.1	47.9	17.3	K	9.5	55.5	23.5		9.4	39 1.0	10.8		8.9	58 2.2	14.3		9.5	58.2	53.4	
9.5	4 49.0	13.8		9.5	22 5.0	4.4		9.3	4.7	55.4		9.5	19.2	10.3		9.5	15 10.8	10.2	
9.0	51.7	23.5	K	9.4	9.4	37.3		9.4	13.1	9.8	B	8.0	49.1	39.5	K	9.0	15.2	44.4	K
8.5	56.9	40.8		9.1	10.2	10.2		9.2	17.3	29.8		9.5	59 30.2	3.6		9.5	16 5.7	46.8	
7.8	5 12.9	24.5	K	9.3	13.9	45.0		9.5	37.8	4.8		6.9	32.1	45.0	K	9.4	19.5	22.3	
9.2	19.2	15.2	K	9.5	21.0	58.5		9.0	50.7	42.3		9.2	34.7	44.0	B	9.5	53.6	35.7	
9.1	6 22.4	44.6	K	9.4	37.8	6.0		8.5	40 29.0	0.4	L	9.5	0 20.3	35.3		9.5	17 10.2	36.7	
9.0	31.3	39.1	K	9.4	23 22.0	59.4		9.5	29.4	49.6		8.1	32.7	58.7	L	9.5	43.5	9.1	
8.9	34.7	7.8	K	9.3	24 5.7	11.3		9.0	40.1	6.2	K	8.5	58.1	32.5	K	9.1	54.4	30.1	
9.5	7 37.4	24.1		8.9	15.7	14.9	K	9.5	41 6.2	14.8		8.7	1 38.0	44.4	K	8.8	55.3	6.3	K
8.8	47.8	45.3	K	9.1	20.9	48.5		8.0	15.3	34.3	K	9.4	56.2	55.1		9.5	18 32.4	53.6	
7.5	8 8.4	40.8	K	8.4	40.8	9.0	K	9.4	18.2	7.8		9.5	58.0	41.9		9.2	19 25.7	18.7	
9.5	53.7	27.0		9.5	57.5	49.8		9.5	23.3	2.7		9.5	2 1.1	41.2	B	8.5	36.2	14.3	K
8.5	9 7.2	16.3	K	9.5	25 2.0	1.6		9.2	42 21.5	42.8		9.0	15.9	26.4	K	9.1	38.1	46.1	

501—560				561—620				621—680				681—740				741—800			
	2ʰ	+43°			2ʰ	+43°			2ʰ—3ʰ	+43°			3ʰ	+43°			3ʰ	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	19 57.1	56.6		9.5	33 56.7	6.2		9.5	53 2.7	58.6		8.0	9 49.7	28.1	L	9.1	21 50.0	43.7	
9.2	20 5.4	59.5		9.5	34 9.7	54.6		9.5	9.6	46.7		9.4	58.0	57.6		9.0	58.7	54.0	K
9.1	25.4	58.3	L	8.3	11.4	48.3	K	9.1	16.1	0.9	K	9.5	10 13.4	34.6		9.2	22 4.2	32.7	
8.0	34.3	30.1	K	9.3	12.1	0.2	B	9.5	54 12.6	51.9		9.4	22.1	15.5		8.6	11.6	10.5	
9.2	21 9.1	30.0		9.5	29.6	42.9	B	7.8	26.2	32.8	K	9.5	26.3	28.4		9.5	16.7	48.0	
9.3	18.4	58.7		5.6	41.1	40.8	K	9.5	55 24.1	14.0		9.1	11 2.3	27.4		9.1	31.3	1.5	
7.8	24.3	1.6	K	9.5	35 34.7	30.6		7.5	57.0	50.1	K	9.5	4.2	38.8		9.5	48.4	4.0	
9.4	42.1	30.1		9.5	53.3	10.5		7.0	56 10.4	8.5	K	9.0	14.0	51.2	K	9.0	55.9	44.8	
9.5	48.7	32.3		9.5	55.9	22.6		8.9	13.0	57.5	L	9.5	21.9	17.8		9.0	23 3.4	15.5	
9.4	22 14.1	46.5		9.1	36 22.0	33.6		8.6	15.6	38.9	L	8.9	56.7	19.2	K	9.5	9.0	14.1	
8.7	22.0	51.1	K	9.3	37.0	7.9		9.0	22.9	0.9		9.5	12 18.1	52.4	B	9.0	12.1	6.3	
9.5	39.1	58.8		9.5	41.7	52.3		9.5	57 9.6	9.3		8.9	36.0	25.0		9.1	19.2	39.3	
9.5	39.5	32.6		9.5	55.6	37.8	B	9.5	53.6	42.6		9.4	38.8	9.2		9.5	43.0	44.4	
9.5	52.4	59.5		7.5	37 7.1	9.1	K	7.8	58 37.1	38.9	K	9.5	55.4	2.4		9.5	48.2	3.2	
9.1	23 8.6	59.0	K	8.8	43.2	16.7		9.5	59 22.6	10.6		9.4	13 9.7	46.7		9.5	48.7	28.7	
9.1	11.5	54.6	K	6.5	38 4.1	38.5	K	9.0	22.7	41.5	B	9.5	14.3	34.8		9.5	57.6	21.6	
9.2	17.4	2.4	R	7.5	28.7	35.4	K	9.3	24.2	41.2	K	9.5	20.0	2.8		9.0	24 0.3	21.4	B
8.3	45.7	48.8	K	9.5	38.7	25.2		9.3	41.6	10.0		9.5	43.1	42.3		9.0	23.1	15.0	R
8.5	24 17.1	53.5	K	7.2	49.3	1.4	K	9.5	0 4.5	9.7		8.9	45.7	27.2		9.2	25.2	46.8	
9.5	18.2	11.8		9.0	39 39.2	43.0	K	9.5	1 0.4	52.0		9.5	14 5.8	31.6		9.4	42.0	27.5	
8.9	24.2	27.0		9.5	40 10.0	47.8		9.3	33.9	26.9		9.5	13.0	7.8		9.5	42.6	41.8	
8.8	34.8	1.0	R	9.5	21.0	10.0		9.2	40.6	56.8		9.5	36.0	57.2		9.5	25 0.5	38.5	
9.0	36.7	30.5		8.7	31.2	12.4	B	9.5	45.4	16.9		9.2	49.5	15.6		9.2	9.7	11.9	B
9.1	25 14.1	54.0	K	9.3	46.1	28.1		9.5	2 13.0	40.4		9.0	50.4	38.0		9.5	11.2	37.4	
9.5	28.5	56.8		9.4	58.7	21.5		9.5	15.2	51.7		9.0	55.0	45.6	B	9.5	12.6	12.5	
9.5	44.2	34.7		8.8	41 10.6	45.1		9.5	25.5	31.3		9.5	15 3.0	15.4		8.0	29.4	21.3	
8.4	56.0	14.6	L	9.5	19.3	57.2		9.5	29.6	53.5		9.2	16.5	51.6		9.2	30.3	58.3	
8.8	26 18.5	9.9	K	9.3	32.1	2.4		9.2	41.9	31.0		9.5	37.1	42.1		9.5	50.9	34.9	
8.2	22.7	33.7	L	9.3	43.5	8.6		7.7	47.7	18.5	K	9.5	42.4	9.0		9.2	26 9.6	55.1	
9.5	57.5	24.3		9.5	42 24.8	52.7		9.5	51.8	50.0		9.5	50.2	6.0		9.5	20.8	30.3	
9.5	27 22.3	50.9		9.3	41.9	20.3		9.4	58.5	35.8		9.5	58.6	46.7		8.8	54.1	35.4	K
9.4	27.4	26.5		9.3	45.3	34.1		9.5	59.6	50.3		9.4	59.7	48.2		9.5	27 9.6	3.7	
9.4	45.9	6.0		9.2	57.8	9.8		8.1	3 13.8	44.7	K	9.4	16 8.2	33.9		8.2	46.7	4.3	K
8.7	46.2	0.7	K	9.5	43 2.6	34.0		9.3	31.7	18.3		9.2	20.3	58.9		9.5	57.4	3.1	
9.4	28 6.0	24.4		9.1	19.0	6.2	K	9.2	53.9	21.8		9.5	37.4	13.3		9.5	28 5.0	25.3	
8.4	6.4	19.1	K	8.3	42.7	13.5	K	9.2	57.5	51.5		9.5	43.8	44.0		9.2	6.0	33.1	
9.4	13.0	25.6		9.5	58.3	38.8	B	7.3	4 9.8	19.2	K	9.4	49.5	49.5		9.5	21.5	35.8	
9.4	18.3	22.4		9.2	44 43.4	5.2		9.5	23.6	29.8		9.4	50.4	54.5		9.5	38.0	24.7	
9.5	31.1	2.0		9.2	45 11.2	29.2	K	9.5	24.3	24.3		9.1	17 1.8	51.1	B	9.1	39.0	39.3	
9.5	36.4	35.4		9.4	12.7	59.5		9.5	51.7	31.3		7.6	7.9	8.5	K	9.5	29 16.1	15.3	
9.5	29 3.5	17.0		9.1	46 5.9	42.2		9.5	5 11.8	43.0		9.4	11.6	4.8		9.5	53.0	52.3	
9.5	8.6	30.5		9.5	42.5	28.8		9.5	12.4	30.3		9.2	13.2	1.2		9.5	57.1	24.2	
8.4	14.1	55.3	K	9.2	48.8	4.3	K	9.5	21.8	56.8	B	9.1	30.6	12.9	K	8.5	30 9.8	35.4	K
9.5	16.9	31.0		8.9	54.0	30.2	K	8.5	22.3	57.7	K	9.5	36.2	55.4		9.4	10.0	30.3	
8.8	30 17.7	28.8		9.5	47 43.8	1.7		9.5	56.2	49.5		9.5	36.7	49.9		9.3	24.3	46.2	
8.8	20.4	29.3	B	9.3	48 6.2	29.2		8.6	6 10.5	1.3	K	8.9	51.8	39.9	B	9.5	45.0	12.0	
9.4	37.7	35.7		8.5	9.6	56.0	K	8.9	32.7	7.4	K	9.5	18 2.5	12.4		9.5	50.5	19.6	
9.4	45.8	13.9		8.8	24.8	8.3		9.1	57.5	49.9		8.4	11.8	52.7	K	7.9	31 1.5	13.4	K
9.1	46.4	21.2		8.0	49 25.6	21.6	K	8.0	7 6.9	12.5	K	8.7	12.9	49.6	K	9.5	8.1	4.8	
9.5	31 11.2	48.8		9.5	38.7	54.3		9.5	16.6	47.5		7.0	27.5	51.8	K	9.5	19.5	5.4	
7.0	13.9	28.0	K	9.5	41.6	48.5		9.2	32.0	22.9		9.1	32.6	29.0	R	7.9	32 1.7	2.9	K
9.5	33.7	37.1		9.2	51.9	15.1	K	9.4	40.6	7.7		7.5	45.0	14.6	K	9.5	3.9	37.2	
9.5	38.2	9.4		9.4	50 0.4	28.8		8.4	48.8	39.0	L	9.1	53.1	20.4		9.5	23.1	51.1	
9.2	59.1	38.9		9.3	37.1	32.3		6.0	8 3.7	29.5	K	9.5	19 13.2	40.9		9.5	44.5	12.0	
9.1	32 0.5	38.1	B	9.5	52.3	58.3		9.3	27.0	43.0		9.5	20 16.0	27.5		9.5	54.3	25.7	
8.8	30.2	40.9		9.5	51 12.5	51.5		9.5	39.9	10.2		9.5	33.5	7.5		9.5	33 19.6	25.1	
9.1	55.2	48.2	K	9.5	26.5	8.1		9.5	45.1	3.6		9.5	35.5	14.5		9.5	53.7	22.5	
9.4	33 18.9	55.1		9.4	52 1.3	17.2		9.5	9 9.5	45.9		9.5	54.6	11.6	B	8.3	34 26.8	53.2	K
9.4	19.3	57.1	B	9.5	18.6	12.5		9.5	27.0	18.4		9.0	21 1.6	28.5	K	9.5	35 37.0	22.8	
9.5	55.7	23.9		9.5	49.2	17.1		9.0	45.6	10.4		8.8	15.1	42.1	K	9.4	46.4	18.8	

801—860				861—920				921—980				981—1040				1041—1100			
	3h	+43°			3h—4h	+43°			4h	+43°			4h	+43°			4h	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	35 50.3	22.8	B	9.3	49 57.1	18.6		9.5	2 23.2	53.5		8.8	19 6.9	48.0	K	8.0	31 24.4	46.0	B
9.5	52.3	23.3		9.5	50 2.5	6.6		9.5	40.3	16.5		8.9	13.4	22.0	K	9.3	35.8	50.9	
9.5	36 27.1	29.4		9.5	13.6	42.3		9.3	42.3	1.9		9.4	43.1	7.1		5.7	32 37.9	4.9	K
8.5	34.5	52.8		9.5	20.0	19.4		8.6	48.8	46.8	B	9.5	58.2	48.9		9.5	33 2.4	59.9	
9.0	40.6	3.1	K	9.2	55.8	29.4		9.5	3 36.5	11.6		9.5	20 3.4	15.4		9.4	29.3	52.7	
9.5	52.1	42.7		8.1	51 5.4	2.8	K	8.9	56.4	25.8		9.5	28.0	33.3		8.3	57.7	21.9	B
9.1	59.6	55.1		9.0	19.1	4.3	K	9.5	4 25.9	19.2		9.5	33.9	22.4		7.4	35 2.4	30.6	K
9.5	37 7.8	10.2		9.3	25.3	9.9		9.0	48.2	10.4	K	9.4	44.0	21.3		8.9	29.8	43.5	K
7.0	17.4	36.8	K	9.2	26.2	2.2		9.5	5 11.0	20.7		9.5	44.1	13.7		8.6	32.3	7.0	B
9.5	38 15.0	55.3		9.5	35.1	2.4		9.5	33.3	39.1		9.3	45.1	7.8		9.5	59.8	57.2	
9.4	24.4	30.0		9.2	59.0	38.0		9.5	6 7.2	39.8		8.6	48.2	26.0	K	9.5	36 0.1	17.0	
9.3	25.9	47.0		9.5	52 1.9	8.8		9.5	10.8	40.4		9.5	50.9	57.5		9.1	8.7	14.2	
9.5	26.1	3.6		9.5	2.9	8.3		9.5	36.7	10.4		9.5	57.8	43.2		9.4	58.8	32.8	
8.3	35.1	12.8		9.0	18.2	10.9	B	9.5	7 5.8	23.1		9.3	21 4.7	29.4		9.5	37 3.0	14.8	
9.5	48.7	50.5		9.5	19.7	1.1		7.0	51.4	18.9	K	9.3	7.0	29.7	B	9.5	8.6	16.2	
8.5	39 1.9	53.5		9.5	35.0	53.3		9.5	8 5.7	28.6		9.5	18.4	3.4		9.5	8.9	45.6	
8.8	5.4	45.8		8.5	42.7	41.0	B	9.4	9.0	23.5		8.6	22.2	30.6	K	8.6	11.3	7.9	K
6.2	9.9	30.3	K	9.3	53 2.0	51.2		7.0	20.4	21.6	K	9.5	29.9	56.1		9.5	11.7	41.3	
9.4	39.0	27.7		8.8	19.5	23.8		9.5	43.6	30.1		8.8	48.3	23.7	K	9.5	19.2	40.8	
9.5	59.8	7.2		9.2	31.0	14.0	K	9.1	47.1	40.1		9.0	22 8.3	23.9	K	8.7	40.9	23.5	
9.5	40 10.2	53.6		9.2	36.8	36.9		9.5	56.5	38.3		9.2	8.5	7.6		9.4	44.2	44.3	B
9.5	16.6	22.0		8.4	37.5	31.5	L	9.5	9 19.0	48.1		9.2	14.0	5.6		9.5	59.8	39.8	
9.5	20.3	36.5		8.5	49.9	14.2		9.5	22.5	50.7		9.3	23.1	27.7	K	9.4	38 7.6	45.5	
9.5	36.7	18.2		7.7	54.3	34.9	K	9.0	32.0	51.1		9.5	48.0	43.0		7.9	8.9	4.2	K
9.4	41.6	57.0		9.5	54 31.7	57.8		9.5	45.8	29.3		9.5	23 3.9	3.1		8.4	13.3	32.9	
9.3	46.3	31.0		8.8	55 0.3	52.2	K	8.2	10 3.7	14.8	K	8.8	20.6	13.4		9.4	15.7	28.9	
9.5	54.0	21.4		9.5	21.4	1.8		9.2	11.3	4.4		9.5	41.8	30.0		9.5	23.7	50.5	
9.1	41 3.2	25.6	K	8.8	27.0	57.3	K	9.5	11 26.6	10.7		8.6	24 13.5	39.5		9.0	30.8	42.0	
9.5	5.6	42.3		9.5	34.0	54.5		9.0	31.8	45.3		9.5	24.8	16.6		7.7	35.5	0.7	K
9.0	19.4	56.7		8.5	56.1	48.2		9.5	40.2	17.5		9.5	25.0	49.0		8.5	39.9	13.6	
9.5	32.3	29.4		9.4	56 9.0	17.4		7.5	12 27.1	6.1	K	9.5	27.4	43.3		8.8	46.0	20.9	K
8.6	42 8.8	13.6	K	7.3	22.4	1.3	K	9.4	13 23.6	8.2		9.5	27.4	55.9		9.3	50.0	19.2	
9.3	10.2	50.8	B	9.4	47.1	49.5		9.4	37.4	51.0		9.5	32.0	8.9		9.3	52.5	19.5	
9.4	14.6	50.3		9.5	57 3.0	44.6		9.5	56.9	43.0		9.5	25 1.0	3.0		9.3	58.0	58.7	B
9.5	45.8	54.0		9.3	12.3	46.1		9.5	14 2.0	3.6		9.4	1.8	25.6		8.0	39 3.3	58.5	L
9.5	43 17.8	59.2		9.5	36.4	34.3		9.5	15.1	0.2		9.5	17.2	46.3		8.0	7.4	16.4	K
9.0	45.7	11.8	K	9.5	58 5.3	27.5		9.0	15.3	15.0		9.5	33.9	52.9		9.5	15.2	23.0	
9.5	44 26.6	21.7		9.2	19.7	58.2		9.0	18.4	51.3		9.4	52.0	43.0		9.3	19.7	58.1	
9.0	35.8	22.4	B	7.9	36.5	17.2	K	9.5	31.9	46.4		9.2	26 35.5	35.6		9.5	33.7	38.1	
9.3	57.4	50.7		9.2	37.2	12.4		9.5	33.9	23.6		9.5	50.4	55.0		9.2	44.8	13.7	
9.5	45 39.5	5.6		9.5	37.8	37.6		8.5	15 23.2	28.5	L	8.5	59.8	50.5		9.4	46.9	50.9	
9.5	43.3	8.3		9.4	43.4	5.2		8.6	46.2	15.9	L	9.5	27 42.1	8.7		8.7	48.3	47.0	L
9.5	50.0	54.3		9.4	48.2	11.6		9.5	47.0	3.2		9.5	28 12.4	13.2		9.5	51.0	37.8	B
9.4	46 6.8	0.5		9.5	56.9	29.9		9.3	54.4	13.4		9.5	22.8	4.6		9.5	52.0	54.8	
9.5	45.4	6.0		9.5	57.5	22.8		9.4	16 0.4	9.3	B	9.4	41.4	3.3		8.9	59.0	34.3	K
9.5	52.6	27.7		9.5	59 0.9	5.2		8.9	23.5	55.1		9.5	41.9	4.4		9.5	40 8.4	12.9	
9.2	47 28.7	39.8		9.5	2.4	3.8		8.2	28.1	8.5	K	9.5	49.2	37.5		9.2	29.8	36.4	
9.4	45.5	34.5		9.4	11.6	18.4		9.5	30.3	22.3		9.4	51.1	59.9		8.8	34.0	13.8	K
9.5	48.0	41.0		9.4	15.9	13.8		9.4	31.0	55.3		9.0	52.4	59.3	B	9.5	35.2	52.4	
9.5	58.2	49.3		9.0	0 12.4	4.3		9.5	55.1	2.4		9.5	58.5	26.2		9.3	35.4	44.1	
9.5	48 31.1	31.7		9.4	16.8	55.2		9.4	55.6	15.3		9.1	29 4.2	0.1	K	9.5	38.7	8.1	
8.9	50.4	35.5		8.5	29.0	42.8	K	9.5	17 4.0	30.8		9.5	7.9	8.9		9.0	43.6	35.3	K
9.5	56.1	14.4		9.1	38.9	34.4		9.5	8.1	5.0		8.0	16.6	21.9	K	9.5	50.5	23.2	
8.8	49 2.0	13.1	B	9.4	52.7	44.3		9.2	10.0	44.0		9.4	34.7	5.0		9.5	52.0	24.5	
9.0	2.6	21.0		9.5	1 4.3	51.3	B	9.3	20.0	18.3	K	9.5	58.5	53.7		9.4	41 2.0	57.5	
9.3	10.4	38.8		8.1	11.9	58.3	K	9.4	34.0	43.8		7.1	30 17.3	48.6	K	7.0	13.6	19.2	L
9.5	28.7	8.1		9.5	28.7	44.8		7.2	43.1	0.1	K	8.5	21.5	4.3	K	9.0	56.7	51.6	
9.5	35.3	34.1		9.5	37.2	1.1		9.3	18 17.7	2.7	B	9.5	45.8	9.6		9.3	56.8	39.5	
9.2	35.7	59.3		9.5	58.0	20.7		9.5	42.1	51.3		9.4	31 7.5	30.8		9.5	42 0.0	19.2	
9.5	54.3	1.2		9.4	2 5.1	49.7		9.0	54.3	32.7		9.5	9.4	33.6		9.4	15.1	12.3	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	4ᵘ	+43°			4ᵘ—5ᵘ	+43°			5ᵘ	+43°			5ᵘ	+43°			5ᵘ	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	42 16.7	18.8	B	8.8	50 48.4	21.2		8.0	2 37.6	51.0		9.5	20 8.9	30.4		9.5	34 51.4	7.3	
8.9	27.2	3.6	B	9.5	50.9	3.1		9.1	56.7	20.9		9.2	13.9	4.8		9.5	52.8	44.9	
9.1	35.3	49.7	B	8.5	58.2	40.7	K	9.5	3 0.0	17.4		9.0	17.5	21.7	K	9.5	35 21.4	19.2	
8.3	54.0	33.6	L	8.3	51 12.9	13.4	L	9.2	2.3	36.6		9.1	20.3	29.1		9.4	36 9.8	38.6	
9.5	58.4	45.3		9.2	13.5	3.6		8.8	39.6	43.8	K	9.3	31.3	46.5		9.5	11.1	59.5	
9.5	58.9	53.2		var	34.6	36.2	K	9.5	4 9.7	47.5		9.5	37.7	48.9		9.0	14.2	17.6	
9.4	43 14.2	38.1		8.5	45.6	47.4	K	9.5	12.4	31.1		9.4	21 4.9	43.6		9.4	15.9	40.4	
9.1	14.7	36.8	B	9.0	47.4	38.4	K	8.8	41.2	39.3		9.4	9.2	47.3	B	8.5	21.5	0.2	K
9.0	19.3	26.9		9.5	51.3	23.3		9.4	49.3	44.6		9.3	30.2	15.2		8.6	27.1	28.1	K
9.0	25.4	50.8		8.9	52 2.6	32.3	K	9.5	56.4	32.3		9.0	32.7	20.1		8.4	42.3	25.0	K
9.0	50.0	4.8	B	9.0	5.8	11.6		9.4	5 31.5	23.7		9.1	49.8	59.0		9.5	37 21.9	40.1	
9.5	52.2	48.1		9.4	13.5	54.8		9.4	53.3	31.3		9.5	53.2	47.6		9.5	25.3	5.0	
9.4	53.4	28.9		9.5	41.9	10.6		9.5	57.0	19.2		8.5	22 10.4	36.4		9.5	31.4	16.3	
9.1	44 16.7	26.4	B	9.2	53 4.4	7.0		8.8	6 41.1	15.3	K	8.8	38.8	40.5	B	9.5	48.2	0.0	
9.2	17.0	6.3		9.5	45.0	8.4		9.4	43.2	58.3		9.5	39.1	28.2	B	8.9	38 0.1	1.4	K
6.3	28.3	49.0	G	9.3	53.5	0.3		9.3	49.1	58.1		9.4	39.3	40.3		9.5	37.0	0.4	
8.6	34.1	8.5	K	8.0	54 8.2	31.3	K	9.5	7 8.0	1.2		9.2	42.8	0.3	K	9.2	52.3	57.1	
9.5	34.5	27.2		9.3	34.1	6.4		9.5	24.7	3.0		9.0	45.3	46.2		8.9	39 6.3	5.2	K
9.4	35.5	19.4		9.3	40.2	6.5	K	9.4	34.5	45.9		9.5	46.4	10.3		8.2	9.9	38.6	K
9.5	35.7	13.2		9.3	55 13.8	34.3		8.4	8 12.5	57.7		9.5	53.6	48.3		9.5	30.2	6.7	
9.4	37.5	21.2	B	9.5	17.2	5.0		9.3	25.8	32.4		7.2	23 38.0	49.6	K	9.0	48.2	38.3	K
9.5	50.6	0.7		9.2	31.0	46.8		9.4	52.4	27.6		9.3	42.4	56.9	B	7.3	40 5.1	57.6	K
9.0	52.2	24.1	B	9.3	40.3	43.9		9.5	9 2.4	12.2		9.5	50.5	56.8	B	9.3	7.5	6.8	
7.0	54.9	10.4	K	9.4	56.5	55.3		9.5	3.2	58.5		9.5	54.0	34.2		8.0	15.4	38.2	K
9.3	57.9	54.8		9.4	56 3.0	35.0	K	9.4	3.6	47.7		8.8	58.6	18.0		9.2	29.8	23.9	
8.8	45 1.2	51.5		8.6	57 14.0	13.5	K	9.5	47.6	50.8		9.2	24 0.3	12.5		8.5	38.4	50.7	K
9.0	20.6	25.0	K	9.5	17.3	35.2		9.5	52.4	5.6		9.4	12.9	56.8		9.0	52.6	15.7	
9.4	22.7	3.0		9.5	20.4	34.6		9.4	54.3	40.1		9.5	39.8	16.0		9.5	41 11.4	6.8	
9.2	27.3	54.6		9.5	21.0	4.0		9.4	10 7.9	6.0	B	9.4	52.4	58.3		9.5	27.1	53.7	
8.8	38.4	43.7		9.5	37.8	11.2		8.0	31.0	15.5	L	7.5	54.2	8.6	L	9.3	33.2	18.1	
7.5	42.3	14.9	K	9.2	45.3	25.3		9.5	31.0	58.4		8.7	25 20.2	3.3	L	9.5	50.0	17.5	
9.5	54.9	10.3		9.5	50.3	35.2		9.3	44.5	45.0		9.4	26 9.9	1.7		9.5	42 9.2	51.3	
9.4	53.8	0.4		9.4	58 2.5	30.1		9.5	46.3	26.8		8.9	16.8	49.3	K	8.6	14.5	54.1	
9.5	46 17.0	33.8		9.5	10.8	58.9		9.0	12 30.4	24.5		8.2	45.0	32.4	K	9.2	44.0	55.8	K
9.5	31.5	33.3		8.9	25.7	12.3	B	9.0	49.9	5.1		7.3	45.2	58.7	K	8.5	47.1	59.8	K
9.3	48.2	0.1		8.0	28.7	55.9	K	9.1	55.5	54.3		9.3	27 5.5	17.7		9.4	51.1	13.5	
9.4	53.1	7.5		9.5	44.9	50.1		9.5	13 34.8	8.8		9.2	9.8	27.3		9.3	43 21.2	40.8	
9.5	47 23.0	58.6		9.5	59 32.6	53.7		8.5	35.3	49.4	K	9.5	52.4	56.5		9.4	37.3	19.2	
9.0	43.4	1.1	B	9.5	45.0	36.5		8.8	54.7	44.8	K	9.4	28 49.3	57.0		8.2	45 1.4	33.2	L
9.4	48 0.0	47.6		9.4	49.8	7.1		9.2	59.8	59.0	K	7.9	53.3	37.1	B	9.0	20.4	45.6	
9.4	0.3	53.4		9.5	0 6.5	21.8		8.5	14 0.9	57.0	K	9.0	57.7	56.4		9.4	41.6	53.7	
9.5	16.9	13.5		9.5	12.0	40.2	B	9.5	19.8	48.7		9.5	29 0.3	26.0		9.1	42.9	51.5	
8.4	25.0	54.7	S	9.0	38.6	25.2	K	8.9	39.3	19.2		9.3	20.9	3.2		8.9	44.0	4.1	
9.5	28.0	54.6		9.2	41.2	25.2	K	8.8	15 4.9	41.2	L	9.2	21.5	6.5		9.4	54.1	24.8	
9.4	30.0	28.9		9.5	45.8	21.9		8.3	27.3	5.6	K	7.2	36.0	13.9	K	9.3	46 26.5	28.4	
8.4	58.6	23.6	K	9.0	48.0	8.0	K	8.8	57.4	49.0	L	8.3	49.7	38.5		9.5	35.9	5.7	
7.3	49 2.8	5.8	K	9.5	58.2	18.9		9.5	16 22.1	36.0		8.3	56.5	18.8	K	9.5	54.8	24.0	
9.2	12.9	31.0	K	9.5	1 13.0	40.4		8.2	34.2	31.1	K	9.5	30 30.3	33.4		9.5	58.3	26.3	
8.6	31.3	5.6	K	9.4	21.8	9.0	B	9.5	43.3	17.2		8.9	31 50.2	12.4	K	9.5	47 1.8	13.8	
9.1	36.6	47.1		9.5	34.2	23.2		7.4	44.1	52.4	B	9.5	32 20.8	41.3		9.5	13.9	52.1	
7.8	36.9	45.6	K	9.5	37.4	8.9		9.4	58.3	37.0	B	8.7	47.0	17.5	L	9.5	25.6	56.3	
9.3	53.9	14.1		9.3	37.5	38.9		6.8	17 13.9	14.5	K	9.0	33 0.5	24.9		8.2	36.8	11.0	K
9.3	55.4	23.1		9.3	40.8	40.0		9.4	46.7	23.7		8.7	11.7	54.5	B	9.5	46.3	44.5	
9.4	57.5	54.0		8.0	47.6	15.6	K	9.5	59.8	53.7		9.5	12.1	33.2		9.4	50.9	44.2	
9.0	50 15.0	20.7		8.4	2 3.4	33.0	B	9.5	18 3.3	36.8	B	9.2	14.0	54.7		9.5	50.9	53.3	
9.0	18.3	55.6		9.3	6.3	45.2		9.5	9.3	41.8		8.8	14.2	28.6	K	8.8	56.0	20.8	
9.5	19.6	18.8		9.4	19.2	25.9		9.5	50.7	33.1		9.0	17.3	13.3		8.7	48 4.9	29.0	
8.9	31.0	32.2	B	9.0	29.6	24.9		9.5	52.8	18.5		7.5	49.0	28.9	K	9.4	5.4	15.6	
8.5	32.1	21.3	L	9.5	34.7	8.7		8.6	19 52.5	15.1	K	9.5	34 11.9	18.0		9.5	28.0	50.0	
9.4	34.9	8.3	B	9.4	35.3	28.7		9.5	55.4	21.1		8.2	14.3	53.0	K	9.4	30.4	18.7	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	5ʰ		+43°		5ʰ—6ʰ		+43°		6ʰ		+43°		6ʰ		+43°		6ʰ—7ʰ		+43°
m	′	″	′		m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	
9.5	48	48.3	24.7		9.3	58	32.0	53.9	8.0	12	42.6	45.6	9.3	29	49.0	58.6	9.3	55	13.8	7.9	
7.9	49	14.8	58.0		9.0		36.4	44.5	7.4		44.4	17.9	K	9.4		49.0	52.6	9.5	56	16.9	44.2	
9.4		27.6	14.1		9.5		46.8	59.0	8.7		55.1	13.6	B	9.2	30	45.0	17.6	K	9.3		21.3	31.6	
7.8		46.7	9.6	K	9.4		51.2	23.6	6.9	13	50.3	17.7	K	9.1	31	11.7	34.0	K	8.4		39.0	3.9	K
9.5		59.0	44.5		9.2	59	10.4	9.1	K	9.0	14	17.0	20.1		9.5		35.8	1.1	9.5	57	59.9	19.6	
9.2	50	29.8	35.0		7.4		13.6	9.5	K	9.5		17.5	14.5		9.5		40.7	42.8	9.5	58	6.2	17.4	B
9.5		33.6	8.5		9.5		14.9	13.5		6.9		18.7	36.5	K	9.5	32	34.9	23.7	9.5		59.3	44.7	
9.1		34.8	58.4		9.1		29.5	1.0	K	9.5		30.0	41.8		9.3		48.1	23.2	B	8.6		59.4	12.8	K
8.3		37.3	39.5		9.4		30.2	59.0	K	9.1		54.3	32.9	K	8.9	33	36.1	48.8	B	9.0	59	25.5	31.2	K
8.2		44.3	26.0	L	9.5		46.4	42.0		9.5	15	5.1	56.3		8.9		48.5	11.8	K	9.5		49.8	21.8	
7.8		45.2	15.9	K	9.2	0	5.8	57.2		9.5		9.4	27.6		9.3		55.4	43.6		9.5	0	12.6	54.1	
9.3	51	1.6	53.1		9.3		47.2	43.4		9.5		12.0	2.8		9.5		56.7	45.6		9.0		38.3	31.2	K
9.5		12.4	18.2		9.1		56.1	21.6		8.5		28.1	9.4	K	9.5	35	0.3	15.3		9.0		51.5	1.3	K
9.5		19.7	46.7		7.0	1	0.9	49.5	L	9.5		42.0	41.3		9.5		30.0	9.5		9.5		54.8	22.8	
8.9		26.1	29.5	K	6.9		3.3	11.3	K	9.3		43.3	57.2		5.7	36	18.5	43.1	S	9.5		54.8	34.2	
9.4		27.2	59.2		9.4		5.9	0.3	B	9.0		48.7	58.0	B	8.8		20.0	44.1	L	8.7	1	29.9	29.2	K
9.5		39.5	9.0		9.2		12.2	6.8		9.2		50.0	27.5		9.5		46.6	17.1		9.5		53.0	19.8	
9.5		54.3	32.0		9.3		21.0	23.9		8.9		56.1	58.9	K	9.5	37	0.8	19.3		9.5	2	27.3	30.7	
9.3	52	12.9	46.8		9.4		42.0	16.4		9.5	16	31.4	23.3		9.2	38	16.8	11.2		9.5		46.7	5.8	
8.8		21.6	30.2	K	8.5		42.7	25.6		9.5	17	18.5	26.7		8.0		19.2	59.4	K	9.5	3	4.9	13.4	
7.3		25.1	22.3	B	9.3	2	1.8	18.3		9.1	18	1.0	9.1	K	7.6		53.5	54.1	K	9.5	4	1.5	38.7	
9.3		56.3	33.1		9.5		14.2	40.6		9.4		2.9	9.5		9.5	39	13.7	43.3		9.2		18.7	55.4	B
8.2	53	2.2	46.8	K	9.2		18.6	50.2		8.4		5.5	34.7	K	9.4		14.6	43.8		9.0	5	27.3	37.2	
9.5		8.3	11.9		9.4		44.3	51.3		9.4	19	19.0	56.7		8.8		54.0	53.4		8.3		30.9	48.7	K
9.5		47.6	6.5		8.8		58.8	32.9	K	9.5		41.5	42.5		9.5		57.9	26.8		9.0		31.6	22.4	K
9.4		47.7	43.3	B	9.4	3	5.2	3.8		9.2		44.7	25.6		9.5	40	4.7	47.6		9.4	6	31.3	47.6	
9.0		59.0	32.4		9.0		46.9	23.2		9.1	20	13.6	40.9		8.4	41	21.6	50.6	K	9.5		44.2	17.7	R
9.5	54	0.4	41.9		9.4	4	18.3	43.2		7.6		14.5	58.3	K	9.5		34.9	43.2		9.0		52.2	34.2	K
9.5		0.6	12.8		9.5		21.4	5.5		8.0	21	12.4	48.4	K	9.5		37.3	13.3		9.2	7	4.2	52.5	K
9.5		1.0	18.2		9.3		35.1	17.1		9.3		34.6	58.3		9.5		58.8	27.3		9.4		55.0	0.0	
9.5		6.1	44.0		9.5		37.3	25.8		9.2		46.8	48.8	K	9.5	42	50.8	55.6		9.3		56.5	48.1	
9.5		9.0	20.8		9.5		52.9	9.3		9.5		48.0	39.6		9.5	43	31.7	21.8		8.7	8	13.3	17.3	K
9.3		20.4	23.1		9.5		53.6	10.8		9.3	22	5.1	17.2		9.0	44	0.4	40.2		9.5		21.9	20.8	
9.4		25.0	2.1		9.5	5	28.0	11.0		9.4		11.3	44.3		9.4		19.6	58.8		9.5	9	29.1	31.2	
9.5		31.0	4.6		9.4		32.0	11.5		8.4		43.7	15.2	K	7.5		25.9	6.9	K	9.2	10	9.7	10.8	K
9.2		45.4	2.3	K	9.2		38.6	9.2		9.5		47.0	9.0		9.0		34.5	48.6		9.3		15.3	22.2	
9.4		54.3	3.7		9.2		42.4	3.6		9.2	23	23.6	43.6		9.2	45	4.3	40.0	K	9.5	11	28.5	13.8	
9.2	55	12.9	0.5	K	8.7		46.3	59.9		8.6		30.0	12.6	K	9.3		20.3	24.8		9.3		43.1	13.5	
9.5		28.2	47.3		8.7		49.6	42.6	K	9.2		31.6	33.0		9.3		25.5	54.1	K	9.3		45.2	16.7	
9.2		48.4	54.0		9.5		58.8	17.3		9.4		37.7	4.2		8.9		44.4	36.7	K	8.6		50.3	41.8	K
9.5		50.0	58.3		9.5	6	14.4	41.4		9.5		53.0	2.0		9.4	46	29.0	57.8		9.1		58.4	25.5	
9.2		56.3	41.7		9.4		21.2	10.6		7.5	24	13.3	10.5	K	9.2		38.8	55.1		9.3	13	25.5	46.1	
9.5	56	3.1	29.2		9.4		27.4	21.3		9.3		14.0	5.0		9.2		49.2	58.8	K	9.5		30.2	50.0	
8.8		12.8	3.7	K	9.3		31.7	3.2		9.5		37.1	57.6		8.0	47	3.1	23.8	L	9.3		42.8	32.6	
9.5		14.5	32.2		9.5		33.0	28.1		7.3	25	25.0	49.1	G	8.7		4.3	4.2	K	9.5		43.3	44.1	
9.2		16.0	37.8		9.3		56.4	3.6		8.7		27.4	22.4	K	9.5		20.3	41.2		8.5	14	3.4	29.2	G
9.1		16.6	0.8	K	9.2	7	8.0	36.2		8.7		38.6	30.7	K	9.5		44.9	38.2		9.4		19.8	4.5	B
9.3		17.2	37.5		9.4		37.5	50.9		8.7		39.4	25.4	K	8.6	48	12.2	23.0	B	9.4		29.4	3.7	
9.5		35.6	46.7		9.1	8	24.2	14.4		9.4	26	26.8	19.1		9.5		39.9	49.1		9.0	15	4.6	14.8	K
9.4		36.0	39.6		9.5		28.0	24.8		9.5		30.6	31.5		8.7	49	50.6	10.2	K	8.6		20.6	25.3	K
9.4		36.5	43.9		9.5		45.5	4.6		9.5		50.1	29.8		8.7	50	11.7	9.2	K	6.7	16	42.5	32.2	K
9.1		53.8	18.9	K	9.5	9	16.9	34.5		9.3		58.1	39.9		9.2		20.2	49.5		9.1	18	9.8	27.2	
8.7	57	13.2	17.8	K	9.4		55.0	8.5		8.4	27	50.1	21.1	K	9.5		24.2	19.3		7.7		17.5	2.3	K
8.7		16.0	48.2	K	9.5	11	5.2	19.3		9.3	28	0.5	9.1		8.9	51	5.8	53.1	K	9.4		37.0	48.3	
9.5		29.6	38.2		9.5		19.7	3.8		9.4		16.9	47.9	B	9.5		7.2	49.8		8.6		56.0	8.4	K
9.5		50.4	18.7		9.2		35.4	46.2		8.8		17.5	28.1	K	9.5		50.8	52.6		8.8	19	8.1	37.9	B
9.4		59.2	30.2		9.5		54.2	38.4		9.5		38.8	56.5		9.2		53.7	26.8		8.0		42.1	51.1	K
9.4	58	2.8	59.3		8.7		59.1	35.2		9.5		52.1	31.5		9.3	52	4.3	20.8		9.5	20	0.4	31.6	
9.5		20.8	11.4		9.5	12	0.1	14.2		9.5	29	40.6	56.7		8.8		38.5	36.7		8.2		41.2	48.8	K
9.5		22.7	17.9		9.5		25.0	11.3		9.1		46.7	45.0		9.3	54	57.4	45.1	K	9.1		47.0	55.7	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	7ʰ	+43°			7ʰ—8ʰ	+43°			8ʰ	+43°			8ʰ—9ʰ	+43°			9ʰ—10ʰ	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	21 24.3	21.8		9.5	50 31.6	1.8		9.5	15 44.2	34.2		9.5	56 49.5	23.4		9.4	29 29.6	39.5	B
8.9	22 41.8	21.3	K	9.3	51 50.1	57.0		8.6	17 40.3	34.0		9.1	58 22.5	11.9	K	8.7	48.5	21.4	K
8.8	47.9	38.1	B	9.5	52 6.2	10.9		9.5	19 19.2	34.5		9.5	56.0	3.7		6.5	58.4	47.7	K
9.2	23 35.8	21.3	K	9.4	53 23.4	54.5		9.3	20 45.7	34.1		9.5	59 18.2	4.4		7.5	30 9.2	36.3	K
9.3	48.4	28.3		9.5	54 44.8	40.4		9.5	22 59.2	40.8		8.2	0 36.5	31.7	K	8.1	30.0	23.3	K
9.0	24 17.2	24.2		8.8	53.7	11.2		8.8	23 52.0	20.6	K	9.5	1 21.4	4.5		9.5	44.3	6.8	
8.5	34.3	46.1	K	9.5	55 26.4	56.0		9.4	24 12.6	3.1		9.4	30.3	20.8		8.2	32 1.4	14.3	K
9.2	43.6	40.7		8.8	28.4	45.3	B	9.5	44.5	59.5		9.3	42.5	15.5	K	9.5	14.3	4.6	
9.5	25 17.9	35.2		9.5	48.0	49.6		9.5	25 6.3	30.0		9.5	2 5.8	17.3		9.5	33 0.1	0.4	
9.2	29.8	1.8		6.3	57 7.4	41.0	K	9.4	16.4	20.2		9.1	37.6	58.7	K	9.2	11.0	14.9	K
6.5	44.1	20.3	K	9.4	58 30.9	31.1		9.5	22.4	4.9		9.3	46.0	56.8	B	9.0	30.0	43.0	K
9.5	26 2.8	25.3		9.2	0 54.5	12.6		9.5	26.4	5.5		9.5	3 13.7	41.7		8.5	36.1	42.7	K
8.9	7.3	4.8	K	8.3	1 27.4	50.4	K	8.0	26 20.3	33.1	K	5.0	4 19.2	48.6	G	8.0	34 15.1	23.0	B
9.2	56.4	14.7		8.8	33.7	41.0	K	6.5	28.8	5.1	K	9.4	59.8	21.4		9.4	22.0	41.7	
9.3	59.0	20.2		9.3	55.0	21.6		9.3	27 15.7	58.0		9.5	5 28.3	45.2		9.5	59.4	0.0	
9.1	27 54.3	53.5		9.5	2 32.7	45.0		8.8	28 25.2	19.2		8.5	39.0	10.4	K	9.0	35 32.5	59.6	
9.4	28 2.2	12.0	B	9.4	3 2.2	59.4		8.9	26.9	53.0		7.5	6 32.0	1.8	K	9.1	44.0	41.7	K
9.0	29 39.8	38.6	K	9.4	9.0	58.4		8.8	27.0	41.0	K	9.4	40.8	1.1		8.0	50.5	54.1	S
9.0	30 19.3	36.7	K	8.0	9.4	26.6	K	9.4	29 26.1	18.7		9.5	7 32.1	51.2		9.5	36 16.0	22.8	
9.1	19.7	9.3	K	9.5	4 31.3	6.4		9.5	54.6	4.1		8.7	36.0	33.3	K	9.5	47.3	54.7	
9.5	47.5	34.1	B	9.4	44.6	3.0		9.3	30 20.7	17.6		8.5	37.5	40.7	K	8.9	37 57.9	3.6	K
9.5	51.3	33.6		9.5	47.4	7.2		8.5	31.5	59.5		9.3	8 3.8	15.3		8.0	38 54.1	5.8	K
9.5	31 8.3	21.8		7.2	50.6	28.5	K	8.5	32.4	51.0		8.6	9 44.3	7.0	K	9.5	40 35.3	24.8	
9.5	18.0	15.7		9.5	51.0	30.4		8.8	50.0	38.5	K	9.4	10 30.0	29.8		9.3	47.9	7.1	B
9.5	44.4	24.2		9.5	5 9.3	34.0		9.2	32 26.7	4.4		9.1	59.0	13.4	K	9.2	41 16.2	25.9	B
8.9	32 17.6	2.4		9.5	18.2	16.5		8.9	33 8.6	21.6		9.5	11 47.5	37.3		9.5	35.0	42.2	
9.0	33 16.9	18.8	K	9.1	20.3	23.5	K	7.2	57.1	12.6	K	9.4	53.4	20.9		9.3	42 29.6	0.7	
8.5	17.8	34.4		9.5	26.3	8.1		9.5	34 38.5	43.5		9.4	14 37.6	36.7		9.5	44.5	32.8	
9.0	46.9	0.7	K	8.9	31.5	26.4	K	9.5	59.6	56.5		8.1	54.1	35.9	B	9.5	43 5.5	13.9	B
8.5	34 29.8	41.6	K	9.2	55.8	57.2		9.5	35 28.1	59.9		9.0	15 43.0	20.4	K	9.5	23.7	0.4	
9.0	36.2	52.4		8.8	6 55.0	42.8	K	8.8	30.2	44.0		9.5	16 7.8	44.7		9.5	45 7.0	19.8	
8.0	35 10.0	21.2	L	9.5	7 5.8	15.7		9.0	36 25.7	44.6		9.5	45.2	14.8		8.7	22.9	57.7	B
8.5	35.2	31.5	L	9.5	7.9	47.1		9.4	39.3	31.2		8.6	17 20.0	37.8		9.5	46 6.1	4.6	
9.4	50.7	47.9	B	9.3	32.9	1.5	K	9.0	37 3.4	23.6	K	9.5	34.4	2.2		9.5	47 7.8	48.2	
9.1	37 55.4	9.9		8.2	42.6	56.7	K	9.5	15.2	54.0		6.8	18 13.3	23.3	K	8.5	48 24.4	52.2	K
8.4	38 11.8	22.2	K	7.3	54.1	51.2	K	9.0	38 29.0	8.2		9.3	15.0	14.1	B	9.5	54.1	33.8	
9.3	19.8	15.1		9.3	58.4	12.7		9.4	51.1	55.8		9.5	36.8	14.9		8.6	49 5.9	54.7	K
9.1	27.7	12.2		9.3	8 0.7	34.3		8.3	39 9.9	41.0	K	9.5	41.5	12.1	B	9.5	50 58.9	25.4	
9.0	39 10.3	36.6		8.8	38.3	20.0	K	9.5	10.0	14.2		9.1	19 34.9	30.5	B	9.4	51 5.6	12.4	
9.0	13.5	41.7		9.4	9 4.9	52.8		8.8	41 27.1	7.3	K	9.4	37.8	12.8		7.0	6.2	0.6	K
9.0	17.9	28.6	K	9.5	46.0	2.1		8.6	56.4	38.5	K	8.1	43.2	50.7	L	9.0	9.9	31.4	
9.3	40 44.0	8.8	B	9.3	10 29.6	23.2		9.5	43 39.4	21.2		9.3	51.5	55.3	S	9.4	39.6	8.1	B
9.5	42 3.6	24.9		9.3	32.7	12.6		9.4	45 15.3	30.5		8.8	20 14.6	39.9	B	8.8	52 28.4	49.2	K
9.5	23.7	40.8	B	9.3	35.3	53.5		9.5	28.1	5.3		9.5	31.1	6.1		8.2	32.9	41.3	K
9.5	44 19.6	11.7		9.3	11 3.1	36.9		9.5	46 56.2	36.5		8.4	50.0	38.8	K	9.2	36.4	50.8	B
9.3	39.3	32.1		9.5	8.8	25.5		9.3	47 9.8	1.7	K	9.5	21 31.3	38.7		8.7	56.1	29.8	L
9.0	45 3.8	51.4		9.2	28.4	2.3		9.5	49 23.5	10.8		9.5	45.2	42.0		9.4	53 0.9	53.3	
9.1	36.0	41.0	K	9.3	43.2	54.5		9.5	25.4	58.9		9.5	48.7	50.0		8.0	55 35.4	4.6	K
9.5	46.9	35.0		9.4	43.7	50.7		8.6	50 40.1	4.9	K	9.5	22 59.0	6.1		9.4	51.9	2.0	
9.3	47 38.9	11.0	B	8.6	45.9	47.4	K	9.3	50.3	50.4		7.8	23 44.7	56.7	L	8.9	58 50.4	43.8	K
8.5	53.7	23.0	K	9.2	53.1	42.1		8.4	53.2	27.5	K	9.5	24 3.6	5.1		9.1	59 21.7	52.9	B
9.4	59.5	48.5		9.4	12 18.2	40.2		9.5	51 52.4	13.9		9.2	31.2	30.7	K	9.5	0 17.7	32.8	
8.1	48 6.9	2.1	K	9.4	27.6	16.1		9.4	53 21.1	40.1		9.4	37.5	8.9		9.5	44.9	50.7	
7.5	27.9	54.0	K	9.5	46.7	14.0		9.3	31.2	33.3		8.7	52.7	56.2	K	9.1	1 0.5	2.6	
9.5	51.2	13.2		5.0	54.0	38.8	K	9.0	58.0	20.5	K	8.5	26 54.6	36.7	K	9.1	2 44.8	22.9	
9.1	49 47.0	39.6	K	9.5	14 17.8	18.9		9.0	54 48.1	5.9	K	9.5	27 11.5	36.3		9.2	54.8	4.8	
8.8	50 14.5	22.1		9.4	48.9	32.2		8.7	55 11.7	36.8	K	9.2	37.5	51.6	K	9.1	3 7.1	5.9	B
9.4	14.7	42.6		8.3	15 3.1	27.7	K	9.3	13.0	29.3	K	8.7	28 15.0	44.2	K	9.5	4 17.7	13.4	
9.2	22.0	40.5		9.4	21.0	59.5		9.5	47.2	29.8		9.5	29 12.9	21.4		9.5	17.9	4.0	
9.5	23.0	6.0		9.5	32.1	43.9		9.3	56 38.8	6.0		9.2	26.5	51.2		9.3	5 11.9	55.7	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	10ʰ	+43°			10ʰ—11ʰ	+43°			11ʰ	+43°			11ʰ—12ʰ	+43°			12ʰ—13ʰ	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	7 9.4	12.4		8.5	46 30.7	37.8	B	8.0	22 9.8	27.9	K	8.7	54 57.6	8.7		9.1	30 30.4	51.5	
8.0	25.9	31.8	G	9.3	35.3	22.0		6.2	39.6	58.8	G	6.7	55 6.9	54.6	B	9.4	45.0	9.8	
8.9	35.7	5.6	B	9.5	47 21.0	35.0		8.8	23 3.2	37.9	K	9.5	56 25.3	25.5		9.2	47.9	0.2	
9.3	47.1	41.9	B	9.5	24.8	32.6		8.9	4.8	5.3	B	8.0	58 10.0	59.3	L	8.9	31 10.3	0.2	K
3.5	8 18.9	39.8	K	9.1	27.8	14.7	K	9.4	24 55.8	10.2		9.5	59 39.8	52.4		9.3	14.0	16.6	
8.5	27.5	21.9	K	9.4	54.7	28.5		9.5	26 42.9	5.1		7.3	44.0	27.5	K	9.3	32 0.6	15.3	B
7.0	9 47.4	47.2	K	9.5	51 46.9	2.3	B	9.2	53.6	52.8	K	6.8	59.0	53.4	K	9.5	32.5	50.4	
9.5	10 30.4	55.7		6.2	52 7.7	41.5	K	9.1	27 39.2	42.3	K	9.2	0 4.2	1.7		9.3	33.0	20.1	
9.2	12 28.8	33.8	K	7.0	27.7	30.1	G	9.3	28 3.1	17.0		9.5	30.1	26.5		7.7	33 3.4	32.0	K
9.5	13 39.5	3.0		8.9	53 7.3	59.4		9.2	35.0	14.0		8.8	34.8	35.0		8.8	34 1.1	47.0	K
7.6	51.8	20.8	B	8.7	54 0.9	12.4	K	9.2	35.9	32.9		8.5	38.7	30.5		8.9	35 38.2	17.6	
9.5	14 24.0	23.0		9.5	17.8	18.2		9.0	37.5	7.1		9.0	1 15.4	46.4		9.2	37 4.5	10.1	
7.8	16 33.9	27.2	L	9.4	36.3	57.0		9.5	30 4.6	41.8		9.5	37.3	43.9		6.7	42.0	54.4	G
9.0	17 12.8	29.7	K	9.5	55 24.3	40.6		9.2	31 12.9	48.3		7.8	2 1.5	17.1	K	9.0	42.3	0.9	
9.0	23.9	30.7		9.4	49.8	6.7		8.2	16.7	8.0	L	7.8	37.7	6.1	K	9.4	38 49.5	30.0	
9.3	18 7.0	31.6		9.3	56 12.5	31.1		9.5	45.6	29.4		9.3	49.6	42.9		9.5	39 1.6	12.1	
9.5	18.3	3.5		9.5	37.2	21.6		9.5	52.7	20.5		9.1	3 45.2	9.1		9.4	17.1	51.9	
9.2	19 3.4	42.4		9.5	57 0.3	22.1		9.5	32 0.4	2.3	B	8.8	4 38.8	43.0	K	7.3	59.0	56.9	K
8.5	19.4	43.6	K	8.9	2.2	55.0	K	9.5	2.8	0.9		9.5	6 52.3	28.9		9.0	40 29.9	11.3	
9.3	44.8	44.1	K	9.0	58 37.2	59.0		8.8	33 49.5	41.8		9.4	7 33.3	43.9		8.2	41 35.7	55.6	B
9.5	20 39.4	3.8		9.5	59 24.8	9.6		9.1	34 7.6	15.3	B	8.8	36.5	54.9	K	7.5	42 20.5	1.2	K
9.1	42.4	17.3		8.6	0 11.2	26.6	K	9.5	35 19.4	22.5		9.3	8 32.6	32.5		7.9	23.3	2.4	K
9.4	22 37.8	57.7	B	6.5	1 30.3	59.5	K	9.1	36 22.2	46.3	K	9.5	9 15.0	2.2		8.0	43 17.6	1.0	K
9.4	42.4	38.2		9.0	42.8	17.1		9.3	36.4	31.9		8.3	28.3	53.6	B	9.2	44 31.5	8.6	
9.3	23 57.4	48.6		8.0	2 31.4	11.7	L	9.2	55.9	26.4		8.8	10 9.1	36.4	K	7.5	38.0	15.1	K
9.3	58.5	56.5		9.1	38.3	10.0		9.5	38 55.7	25.0		9.5	52.8	22.5		8.5	45 6.5	40.9	B
9.3	24 17.7	13.2		9.0	3 9.3	7.2	K	9.0	39 5.6	9.8	K	8.0	11 42.5	53.8	K	8.2	20.1	26.5	B
9.4	29.5	6.2	B	8.5	32.8	37.0	K	9.3	9.9	52.3		9.0	52.3	27.0		9.5	55.7	8.8	
8.8	51.4	44.6	B	7.5	44.7	38.4	K	8.9	37.4	10.2	K	9.5	53.0	36.1		9.0	46 2.1	33.9	
9.4	26 20.5	25.6	B	9.3	5 9.2	37.5		8.0	54.7	58.8	L	9.5	13 16.7	2.5		9.0	30.6	33.6	B
9.5	26.9	51.5		9.5	6 34.8	16.6		8.8	40 40.4	19.0		9.5	27.8	24.5		9.2	40.5	56.4	
8.8	37.3	2.3		9.3	7 6.4	33.0		8.8	46.5	14.0	K	8.9	14 53.2	2.0	K	9.5	55.5	35.0	
9.5	27 45.9	50.6		9.5	17.9	45.5		9.5	41 1.4	43.3		8.9	15 58.3	13.0	K	9.3	47 0.6	4.9	
9.4	29 1.9	29.7		9.2	25.3	0.2	B	9.5	42 0.3	3.1		9.4	16 2.4	8.7	B	9.0	37.5	35.0	R
9.5	30 15.8	31.2		7.9	34.3	7.4	K	7.3	29.1	31.9	K	8.0	3.6	42.1	B	9.1	50.3	40.5	
9.5	49.0	35.1		7.8	46.5	15.6	G	9.5	50.5	40.8		8.0	4.3	32.9	L	9.3	48 16.8	23.6	B
9.5	31 18.9	25.7		9.2	51.3	33.4	B	9.5	43 45.2	17.5		9.3	10.5	53.3		9.3	18.3	42.4	
9.5	33 0.6	29.1	B	8.4	8 30.3	8.7	K	8.9	54.1	54.3		6.3	40.2	21.3	K	9.4	19.9	23.8	
9.5	34 5.9	49.1		8.9	36.4	1.4	K	8.5	54.5	43.9	L	8.9	17 2.4	52.2		9.5	43.1	11.1	
7.7	35 22.4	7.5	K	8.8	9 18.2	36.0		9.0	44 24.1	14.0		7.2	15.4	53.8	K	9.3	49 18.5	30.1	
8.6	36.4	14.2	B	9.5	33.6	6.7		9.0	29.2	22.0		7.0	51.3	40.0	K	8.8	19.3	7.1	K
9.3	36 46.0	33.7		6.8	10 27.6	6.4	K	8.8	45 6.4	13.5	K	9.4	18 26.5	46.9		8.8	35.5	47.3	B
9.3	37 20.9	49.1		9.2	45.9	48.5	K	9.0	34.1	19.0	K	8.2	51.5	8.1	K	9.2	50 6.3	49.6	B
9.0	30.4	14.7	K	9.3	11 33.5	6.1		9.0	52.9	23.0	K	8.1	52.3	55.4	K	8.3	27.0	10.6	K
7.5	38 29.8	48.1	K	9.2	12 32.9	20.1	B	7.5	46 4.2	44.3	K	9.5	21 23.4	3.3		8.8	52 34.7	31.9	B
9.2	39 31.0	41.1		9.5	13 19.0	5.0		9.0	53.1	58.8		9.3	25.5	39.6	K	9.0	44.9	59.9	
8.7	40 4.0	7.5		9.5	14 34.7	42.5		9.2	48 27.2	4.8		7.8	22 6.3	49.4	K	9.1	59.1	23.6	B
7.7	41 6.4	49.6	G	9.5	15 35.8	25.4		9.3	42.8	50.3		9.5	15.3	35.4	B	9.3	53 2.3	17.1	
9.3	20.3	19.3	K	8.5	45.5	55.2	L	8.7	49 7.6	18.0		9.5	50.7	44.5		9.1	5.3	42.9	
9.0	56.1	46.6	K	9.5	16 18.9	16.5		9.1	44.5	18.5	K	9.3	59.5	30.5		8.5	38.5	14.1	K
8.9	42 57.9	7.9	B	9.5	43.8	18.0		8.0	50 53.1	29.9	K	9.3	23 4.2	51.0	K	9.3	54 45.0	58.9	
8.7	43 5.8	0.2	K	9.2	52.9	56.8		9.5	51 39.5	16.4	B	9.4	48.5	36.0		9.0	55 22.1	51.9	
9.2	11.4	38.6	K	7.8	17 37.1	25.4	K	9.5	52 56.0	21.1		8.5	50.5	57.4	K	8.5	38.0	4.9	K
8.4	51.6	39.6	K	7.7	18 13.2	31.9	K	9.4	56.7	23.8	B	9.5	24 6.9	21.1		8.1	56 36.6	4.0	K
9.4	44 0.4	54.5		9.5	19 40.3	4.9	B	8.5	53 32.5	2.4	K	8.3	29.1	19.9	B	9.1	57 14.4	42.0	
9.4	58.9	43.1		9.1	46.6	53.8		9.1	46.2	43.3		9.1	25 8.5	48.0		6.0	16.6	47.4	K
9.3	45 8.4	47.6	K	9.1	56.7	20.0		9.0	54 6.2	51.8	K	9.0	55.1	8.5	K	9.5	58 32.2	5.3	
5.2	38.3	58.3	K	8.6	20 36.2	36.6	K	9.4	43.3	8.1		9.5	26 23.3	6.2		9.3	59 32.5	55.3	
8.8	46 9.1	19.0	B	7.2	57.1	36.9	K	5.1	45.5	51.5	K	8.5	27 2.1	10.8	K	9.0	36.4	22.1	
9.5	20.6	40.8		9.5	21 32.4	3.0		8.2	54.2	56.9	B	9.4	28 16.0	21.0		7.1	1 17.5	8.9	K

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	13ᵘ		+43°		13ᵘ—14ᵘ		+43°		14ᵘ—15ᵘ		+43°		15ᵘ		+43°		15ᵘ—16ᵘ		+43°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
6.8	1	42.9	57.9	L	8.6	48	16.7	48.5	B	9.3	31	1.9	41.8	B	9.2	10	56.7	54.8	K
8.5	2	0.5	5.3	K	9.4		17.6	50.5		7.0		25.2	27.7	K	8.7	11	16.3	57.3	K
8.4	3	20.0	19.1	K	8.3	49	19.1	22.2	K	9.2	32	27.8	0.7	K	7.3	12	10.6	5.5	K
9.5	4	1.3	36.3	B	8.5		40.8	42.1	K	9.0		58.4	35.3	B	8.7	13	18.4	7.5	K
9.5		39.2	20.5		9.1		46.3	7.8		9.2	33	14.8	11.2	K	9.5		49.4	51.8	
9.5		41.6	26.7		9.5	51	13.9	19.7		9.4		31.6	42.0		8.8	14	45.0	28.7	
9.4		49.0	31.7		9.2	53	27.6	50.0		9.5	34	8.3	23.9		9.5	15	11.8	46.3	
8.8	5	30.5	48.4		9.5		36.5	15.2		9.4	35	36.6	22.4		8.4		43.5	13.0	K
9.2		37.4	32.2	B	8.8	54	36.1	33.1	K	8.8		39.0	5.7	K	9.2		45.5	30.4	
9.5		45.0	10.9		9.5	56	4.0	21.7		8.2	36	21.9	45.0	K	8.5		57.0	39.0	
6.5	6	20.4	22.9	K	9.3	57	4.0	56.2	B	9.0	37	20.1	12.9		8.7	16	46.6	6.7	K
9.2	7	6.7	47.2	K	9.0		20.9	55.7	K	8.6		38.3	31.2	B	9.1		54.9	23.2	K
9.5		15.8	52.7		9.4		40.8	28.7		9.5	38	2.5	45.6		8.2	19	30.1	44.2	K
9.3	8	40.6	1.0	K	8.8		49.0	0.0	K	9.4	39	45.2	4.2	B	8.2		34.0	49.4	B
9.4	9	10.3	44.5	B	9.0	58	7.5	55.5	K	9.5	40	17.8	13.3		9.3	20	26.8	41.7	
9.3	10	42.8	7.2		9.2		48.9	28.7		9.5	41	20.6	25.2		8.5		31.1	42.6	K
9.5	11	18.5	7.4		7.8	59	49.7	4.0	K	9.1	43	2.8	24.2		9.2		51.7	11.0	
8.4	12	5.1	48.0	B	9.5	0	52.5	44.5	B	9.5		51.8	32.1		9.5	21	47.6	13.2	
9.5		10.0	30.7	B	9.5	1	17.8	7.5		9.1	44	28.6	3.9	K	9.0	22	1.4	39.2	
9.5		49.9	35.2		9.5		17.9	18.6		8.9		42.8	20.7		7.3		38.9	22.8	K
8.0	14	7.6	52.6	B	9.1		19.6	39.7	K	9.3	47	6.8	55.0		9.4	23	26.5	5.7	
9.5		41.1	28.2		9.5	2	28.7	50.6		9.4	48	22.2	23.7	K	9.4	24	38.0	54.1	
8.5	15	11.8	43.6	K	9.5		58.8	38.7		8.3		23.3	34.6	K	7.3	25	53.9	22.3	K
8.6	16	9.6	27.7	L	9.5	3	23.7	40.9		9.5	49	27.9	47.0		8.8	26	4.9	42.6	K
9.0		16.8	16.7	B	9.4	4	0.1	45.9	B	9.0		43.8	39.5	K	9.4	28	10.3	8.4	
9.4		50.9	16.8	B	9.5	5	11.5	48.7		8.0	50	38.2	27.6	G	8.2		31.6	27.7	K
9.4	17	54.3	13.8		9.4		14.8	36.8		7.7		39.5	21.3	G	9.1	29	24.2	50.5	
9.0	18	57.1	27.2	K	9.3		26.5	46.8		7.7		50.3	54.1	B	9.4		42.0	6 8	
9.5	19	18.1	33.1	B	9.1		37.4	8.0	K	9.4	52	37.7	19.6		9.0		43.9	40.6	K
9.3		28.8	45.1	K	9.4		40.0	51.2		8.2		45.8	59.9	K	6.7	30	12.1	39.7	K
9.5		28.9	57.0		6.9		48.7	2.0	K	8.9	53	1.3	57.9	K	9.4	31	20.7	28.7	
9.5		58.0	47.6		8.0	6	18.3	6.3	K	9.4		42.3	17.7		8.6		35.8	43.6	K
9.2	20	1.2	22.0	B	9.2	7	16.0	10.6	K	9.0		41.5	56.5		9.5	32	40.2	53.5	
9.5		7.4	18.2	B	9.1		22.0	41.8		8.9		46.4	21.1		8.9		58.9	14.3	
9.4		8.6	18.5	B	9.4	9	42.5	52.0		8.5		48.5	54.5	K	8.5	33	7.9	14.8	
9.2	22	18.1	30.6	K	9.4		44.2	26.6		8.5	56	13.7	13.2	K	8.8		48.2	41.7	
9.0	24	47.0	43.6		8.9	11	58.7	8.0	K	9.5		25.0	40.1		8.7		56.1	11.3	K
9.5	26	3.8	2.8		8.8	12	37.6	47.6	K	9.4		56.2	57.0		9.1	34	21.6	15.3	
8.0		19.2	28.7	G	9.5		58.2	48.9	B	9.0	57	52.8	46.6	K	8.7		23.6	4.4	K
9.0	27	46.5	53.1		9.2	13	27.8	3.9	K	9.3		56.6	6.5		8.0		34.4	9.8	K
8.0	28	35.6	25.7	K	8.8	14	18.9	29.6		9.3	58	1.0	14.2		9.4	36	14.3	6.0	
9.5	31	59.5	5.1		9.0		51.4	6.3	K	9.4		12.0	4.3	B	9.5		18.5	48.1	
9.3	32	14.8	50.3		8.8	15	15.2	21.2	K	9.5	59	14.5	49.5		9.3	38	5.5	43.6	B
9.5	33	49.4	58.5		9.0	16	3.1	9.6		8.8		53.0	46.1	K	8.2	39	12.3	10.6	K
9.5	34	26.5	9.7		8.1		49.8	51.0	R	9.1	0	25.8	41.7	B	9.2	40	46.4	23.2	
9.5	35	11.5	18.3		9.0		51.3	57.0		9.1	2	54.2	54.0		9.5	41	13 0	8.3	
9.2	36	8.6	58.5		9.5	17	33.8	26.7		8.5	4	0.3	22.6	K	9.5	42	37.4	15.3	
9.3	37	18.6	13.3	K	7.8	18	9.1	21.3	K	9.0		10.4	47.5	K	9.4		46.2	42.6	
9.5		53.2	2.8		8.2		31.3	19.6	K	9.5		33.4	41.0		9.5	43	42.3	53.6	
8.3	39	30.6	43.1	K	9.2	19	43.8	40.6		9.5	5	3.9	19.2		9.5	44	32.7	51.6	
9.5		34.2	55.9	B	9.3	22	20.3	44.5		8.7		10.2	4.3	K	8.5		33.9	17.3	K
8.5		36.3	1.7	K	9.4	23	12.7	4.8		9.4		24.3	1.2		8.6		56.4	13.3	K
9.1	41	6.4	16.8	K	8.5		23.2	9.9	B	8.5		37.3	54.5	K	9.5	45	5.7	11.8	
7.8		23.4	31.6	K	8.4	25	4.1	10.2	K	9.4	6	18.5	39.1		9.3		28.1	42.6	
9.3	42	4.6	12.3		9.0	26	36.8	50.5		7.0	8	51.0	35.8	K	8.5	46	49.1	10.8	K
9.3		31.8	22.5		9.4	27	40.2	36.6		8.5		57.0	44.4	K	9.5		53.7	46.6	
7.0		37.7	4.0	K	6.5	28	11.5	38.6	K	9.2	9	6.8	14.9		8.0	47	4.6	4.3	K
9.3		38.6	25.0	B	8.8	29	48.2	40.0	K	8.8		14.6	8.3	K	9.2		10.0	4.4	K
6.8	44	5.5	16.3	K	8.3	30	35.0	0.9	K	9.5	10	10.4	16.5		9.2		10.7	22.3	
9.0		58.3	12.9	K	9.3		54.9	38.8		9.5		54.0	32.4		9.0	48	26.6	49.1	K

2601—2660			
	16ᵘ	+43°	
m	′ ″	′	
9.3	20 17.8	58.1	
9.5	21 18.0	8.8	
9.5	37.2	22.3	
9.2	22 17.5	1.0	K
8.5	27.8	15.3	K
9.5	35.3	4.0	
9.5	44.0	9.7	
8.9	23 8.3	13.8	K
8.2	36.0	42.2	K
7.5	24 45.2	19.9	L
8.0	26 2.9	52.1	L
9.1	13.5	24.8	B
9.2	26.9	1.7	K
9.2	27 31.5	37.9	K
8.8	49.7	52.0	K
9.4	28 3.5	13.2	B
9.4	56.6	10.7	
9.4	29 0.2	59.0	
9.5	43.6	1.7	
9.3	30 14.2	3.2	
8.6	39.7	43.5	K
9.5	31 31.7	12.2	
9.5	32 7.8	36.5	
7.5	58.1	51.9	L
9.5	59.4	25.1	
8.3	33 50.2	40.6	K
9.5	34 1.0	2.3	
9.5	2.2	17.2	
9.1	18.3	12.1	
9.3	32.1	42.1	K
9.2	35 1.2	27.1	
9.5	36 8.2	12.2	
9.0	10.7	40.0	
9.0	11.3	23.6	
9.3	16.7	36.1	
9.1	37 9.2	10.7	K
9.5	38 16.7	13.1	
9.5	39.8	39.0	
8.1	39 26.0	45.5	K
9.5	51.8	42.1	
9.5	57.0	8.2	
6.0	40 38.7	28.6	K
8.9	41 26.7	40.5	K
9.0	42 12.2	33.1	K
8.5	16.3	22.2	L
9.2	57.2	10.2	K
9.3	43 5.1	34.0	B
8.5	12.5	34.2	B
9.5	49.2	19.1	
9.5	44 13.3	44.5	
9.0	36.7	15.2	K
9.5	37.8	24.1	
9.5	55.1	5.0	
6.5	45 10.2	41.0	K
9.5	52.2	33.6	
8.7	46 19.2	12.7	K
9.3	48 10.7	21.2	K
9.5	20.8	19.1	
6.8	59.1	2.7	G
8.3	49 5.2	35.6	K

2661—2720			
	16ᵘ—17ᵘ	+43°	
m	′ ″	′	
7.0	49 49.7	38.1	K
9.5	50 11.8	6.2	
8.9	46.2	52.4	B
9.4	51 7.3	47.0	
9.5	52 14.5	11.2	
9.5	33.2	31.0	
9.2	54.1	18.7	K
7.3	54.2	53.5	K
8.9	53 22.7	57.9	K
9.5	27.3	32.1	
9.5	59.7	36.5	
9.5	54 28.1	21.6	
9.3	33.2	56.1	K
9.5	38.9	42.7	
9.4	47.3	13.7	B
9.3	53.4	8.3	
9.4	55 11.7	19.1	
9.4	34.2	52.0	
8.7	48.1	58.9	L
9.4	56 3.8	32.1	
9.5	52.7	32.1	
8.5	57.9	1.7	K
9.5	57 46.7	16.7	
9.0	58 34.6	27.6	K
9.4	53.9	59.1	B
9.0	59 37.6	33.5	K
9.5	0 4.6	2.1	
9.5	22.6	58.2	
9.4	1 6.1	35.8	B
9.3	15.4	41.8	
9.5	39.2	40.8	
9.5	2 40.3	2.0	
9.3	54.7	24.7	K
8.8	56.8	59.0	
9.3	3 41.5	4.6	B
9.3	50.4	44.0	K
9.5	5 49.7	51.5	
9.0	56.4	57.5	K
9.4	6 33.9	6.3	
9.5	40.7	3.2	
9.4	7 36.2	55.7	B
6.8	59.4	54.0	K
9.5	8 20.7	49.5	
9.0	20.9	56.9	K
9.5	9 38.2	58.0	
8.8	10 3.3	41.0	K
9.1	53.7	52.5	K
9.3	11 14.4	49.6	B
9.3	50.2	43.8	B
9.3	52.2	56.3	K
neb	12 41.2	17.2	L
9.0	13 14.2	18.3	B
9.4	32.7	22.6	
9.2	47.9	2.0	
8.5	59.1	27.6	L
8.7	14 18.2	45.5	L
9.4	15 5.3	25.5	B
9.1	50.1	53.0	
9.4	16 39.6	26.1	
9.4	17 21.9	1.0	

2721—2780			
	17ᵘ	+43°	
m	′ ″	′	
9.4	17 38.2	20.4	
9.3	18 23.3	3.0	K
9.5	55.3	34.1	
8.7	19 0.4	6.7	B
8.5	8.4	3.1	K
9.1	18.0	8.0	K
9.5	20 9.0	53.2	B
9.3	10.2	34.4	
9.3	26.0	24.1	
9.2	30.9	13.0	K
9.5	38.2	16.5	
9.5	58.3	26.0	
9.5	21 13.8	44.4	
9.2	36.6	26.0	K
9.5	37.3	52.5	
9.0	22 5.3	4.1	B
9.3	23 31.0	21.6	
9.2	33.8	55.5	
9.5	46.5	6.4	
7.8	24 55.4	35.0	K
9.3	25 28.4	40.9	
8.3	37.6	49.3	K
7.8	40.9	26.3	K
9.3	51.0	15.5	
9.5	26 12.5	49.2	
9.1	20.9	45.2	B
9.5	49.5	27.6	
7.8	54.9	39.9	L
9.5	27 6.5	0.3	
9.5	7.0	18.7	
8.7	27.6	22.6	K
9.4	45.5	53.0	
9.0	47.2	31.5	K
8.5	28 2.9	19.7	K
9.5	6.0	30.4	
9.5	33.3	56.3	
9.0	35.5	33.6	
9.5	29 22.0	19.0	
9.3	28.5	45.0	
8.3	39.4	37.0	K
9.4	42.7	7.3	
9.1	51.3	45.1	
8.0	30 11.4	37.1	K
9.1	17.1	39.8	
7.1	19.0	30.0	K
9.5	35.0	23.0	
8.8	45.1	9.5	
9.2	51.9	19.0	
9.4	31 44.0	55.9	
9.2	32 4.8	9.1	
8.9	31.4	1.1	
9.3	37.2	14.4	
9.3	41.5	20.7	
9.2	48.7	14.2	B
9.2	49.0	14.0	B
9.2	52.6	47.7	
7.0	33 43.0	42.3	K
9.4	34 26.7	2.2	B
9.5	52.6	49.7	
8.5	35 46.2	12.3	K

2781—2840			
	17ᵘ	+43°	
m	′ ″	′	
6.5	36 16.5	33.2	K
9.5	40.0	44.4	
9.2	37 0.5	24.9	
9.3	1.1	0.0	
9.4	10.5	11.2	B
9.1	32.7	26.6	
9.1	41.1	48.9	
8.7	52.5	44.0	L
9.5	38 3.9	15.4	
9.0	6.4	38.7	
9.1	13.8	3.5	
9.3	20.1	7.4	
9.5	28.0	22.8	
8.0	24.5	14.4	K
8.5	59.6	48.6	
9.5	39 30.5	28.0	
9.5	30.9	50.4	
8.6	37.7	11.6	K
9.2	37.8	16.9	
9.1	45.5	2.4	
9.3	40 1.4	30.4	
9.1	17.7	30.1	
9.5	41 36.5	4.4	
9.0	57.0	28.7	
9.1	42 5.4	20.7	K
9.4	6.0	53.6	
9.0	23.9	25.6	
9.5	29.0	55.0	
8.9	42.8	49.7	
8.0	56.9	21.7	K
9.5	57.7	24.9	
9.5	43 16.4	15.5	
9.2	26.2	24.6	
9.5	42.9	4.9	
9.5	45.7	40.2	
9.5	53.4	53.5	B
9.5	58.4	59.5	
9.5	44 1.4	49.8	
9.5	4.0	12.8	
9.5	17.4	54.0	
8.9	38.0	36.7	
9.5	50.2	11.6	
9.0	45 7.5	47.8	
8.7	24.8	11.7	K
9.2	28.5	9.2	
9.1	56.4	31.5	
9.1	57.0	36.1	
8.5	58.4	21.4	K
9.5	46 27.7	44.8	
8.8	47 12.7	44.1	K
9.5	38.3	58.8	
9.5	48 32.0	38.9	
9.5	35.0	52.3	
9.4	48.1	55.7	
9.4	50.9	48.4	
9.5	49 3.0	7.8	
9.4	17.9	14.4	
8.5	27.6	2.6	
8.2	51.1	52.6	B
9.0	50 29.5	0.2	

2841—2900			
	17ᵘ—18ᵘ	+43°	
m	′ ″	′	
9.2	50 34.9	45.5	B
9.3	59.9	9.1	
9.4	51 0.2	32.7	B
9.5	33.3	52.7	
9.3	46.5	9.1	
9.0	52 49.7	23.8	
8.8	51.0	31.1	K
9.0	52.4	39.2	
8.8	53.6	48.9	
8.8	53 9.3	48.9	
7.2	38.5	25.8	K
9.5	54 3.0	59.6	
9.4	7.2	17.9	
9.2	12.1	44.2	
9.0	15.7	25.3	B
9.1	16.7	18.2	B
9.4	17.7	26.8	
9.5	39.0	12.8	
9.3	47.7	11.5	
8.6	49.0	8.7	K
6.5	55 17.8	14.2	K
8.8	57.0	14.9	K
9.5	56 19.5	5.1	
8.5	25.4	35.4	K
8.4	36.5	27.9	K
8.8	57 16.5	15.2	
9.4	20.6	43.0	B
9.5	22.4	5.7	
8.4	54.6	58.2	K
7.0	58 8.4	15.9	K
9.1	19.9	12.1	
9.4	23.0	21.5	
9.5	59 4.3	26.4	
9.5	12.0	59.6	
9.5	18.0	55.3	
9.5	45.9	21.8	B
9.5	54.5	33.0	
9.2	0 19.7	1.9	B
9.3	45.8	9.9	
9.5	52.4	44.1	
9.1	52.4	2.6	K
9.4	1 3.0	5.0	
8.9	25.4	48.2	B
9.5	36.2	27.5	
9.5	37.9	36.9	
8.6	43.5	9.7	K
9.5	45.0	24.5	
9.5	2 6.0	45.9	
9.4	11.4	39.6	
8.0	27.9	26.4	K
9.4	41.3	16.0	
5.2	3 9.4	27.1	K
9.5	20.0	51.7	
9.5	41.0	21.9	
9.2	4 20.5	16.4	B
9.5	28.5	40.8	
8.0	34.5	31.4	K
8.9	42.4	11.2	K
9.3	47.0	37.9	
9.0	48.5	2.5	K

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	18ᵘ	+43°			18ᵘ	+43°			18ᵘ	+43°			18ᵘ	+43°			18ᵘ—19ᵘ	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	4 59.4	15.0		7.0	18 13.4	23.6		9.5	30 53.5	53.8		9.5	43 38.0	41.6		9.5	56 0.5	0.0	
9.1	5 1.0	17.1	K	7.5	33.7	51.8	G	9.0	31 11.3	10.3	K	9.1	46.7	2.8	K	9.4	40.3	7.1	
9.3	5.4	48.8		9.2	34.4	47.9	B	9.3	41.7	11.0		9.3	44 7.0	13.8		8.8	57 11.5	38.3	
9.5	22.9	12.8		8.5	45.5	32.8	K	9.1	46.0	52.5		7.9	19.8	1.8	K	9.3	17.9	21.6	
9.3	6 41.0	58.7		9.3	49.8	17.7	B	7.6	32 4.2	40.2	P	6.5	55.9	34.0	K	9.4	31.5	27.9	
9.0	7 12.7	48.4		9.4	50.6	46.9		9.3	9.4	51.9		9.3	59.6	18.5		9.1	58 19.2	7.5	K
8.8	16.5	4.7	K	9.5	56.0	44.9		6.0	19.6	6.4	G	9.2	45 16.1	58.2		9.3	59 7.6	9.9	K
8.5	25.4	37.9		8.1	19 3.1	5.7	K	9.5	37.9	47.7		9.1	36.8	6.3	K	6.8	48.7	39.2	K
8.7	26.4	51.4		9.5	37.5	9.2		8.1	42.0	46.9		9.3	43.7	7.9	B	8.5	0 11.2	41.4	K
9.2	34.6	26.9	B	6.7	40.7	50.3	K	9.3	47.8	16.8		9.5	57.2	58.8		9.5	18.3	52.8	
9.4	41.9	52.7		9.4	20 20.2	44.5		9.5	33 20.1	33.6		9.1	46 3.4	24.9	R	9.1	31.9	3.9	K
9.5	55.5	36.9		9.4	33.4	22.6		9.5	26.4	6.7		9.5	4.4	11.5		9.2	32.6	9.0	K
9.5	56.0	48.0		9.4	21 5.5	17.4		9.1	27.0	17.0		9.3	9.1	52.7		9.3	48.5	15.8	
9.4	8 19.0	28.9		9.2	31.9	51.7		9.1	39.9	29.3		7.2	20.2	46.9	G	9.2	53.5	6.1	K
8.6	37.5	10.3	K	9.5	34.0	37.1		9.4	40.4	49.3		9.5	24.0	31.5		9.5	1 3.4	4.1	
9.0	47.4	12.5		9.0	22 0.1	19.8	K	9.5	34 3.2	35.8		8.8	26.6	28.0		9.4	6.9	9.9	
9.3	9 7.0	20.9		9.5	8.6	2.3		9.5	6.1	5.4		9.0	29.2	7.6	K	8.0	48.7	57.3	B
7.4	8.4	17.6	K	9.3	28.7	49.2		9.4	21.8	29.5		9.5	30.9	50.4		9.1	49.0	40.6	
9.4	14.3	29.3		9.5	37.8	4.3		9.5	30.0	53.9		8.7	44.2	13.9	K	8.5	2 31.0	36.2	K
9.5	22.1	1.5		9.4	23 0.0	49.1		9.5	36.2	48.3		8.5	46.0	24.4	R	7.2	48.6	6.0	K
8.0	43.5	14.6	K	9.5	2.1	4.5		8.5	35 43.3	26.8		9.1	47.9	4.0	K	9.5	3 1.5	8.9	
9.2	47.9	56.0	K	9.4	10.3	38.4		9.5	59.8	37.5		8.8	47 14.6	27.6		8.5	5.9	35.9	K
8.9	59.0	50.2	K	8.6	28.5	47.0		9.4	36 6.3	58.5		8.9	15.3	12.3	K	7.8	33.7	42.5	K
9.5	10 13.4	59.2		7.7	51.7	49.9	G	8.7	21.7	16.9	B	8.9	17.3	12.8	K	7.5	42.4	48.7	K
9.5	27.5	17.7		8.4	57.3	9.6	B	9.2	46.5	47.5		9.5	35.1	13.7		9.0	4 11.2	40.3	K
9.3	29.0	37.2		9.1	24 10.0	37.3		8.8	37 4.7	19.4	K	9.0	48.1	44.6	B	9.5	19.0	28.9	
9.1	55.5	12.9	K	8.4	19.0	30.7		7.3	9.8	24.4	K	7.0	51.4	31.7	K	9.5	20.4	12.3	
9.1	58.5	8.2	K	9.1	33.4	10.5	B	9.5	15.5	37.2		9.3	48 5.2	41.4		9.5	37.0	53.1	B
9.2	59.1	27.8		7.0	43.4	50.3	G	9.3	18.6	46.0		9.5	11.0	53.0		9.5	43.1	5.0	
9.5	11 25.0	37.2		9.1	25 23.5	54.0		9.4	24.4	59.4		9.5	33.7	41.2		8.8	5 4.9	12.3	K
9.4	33.7	53.9		9.1	35.9	26.8		9.5	28.7	34.5		7.3	34.9	32.2	B	8.8	19.9	19.3	K
9.1	12 18.1	19.6		8.8	43.9	15.0		9.5	38 35.1	27.6		7.5	49 6.4	56.8	K	9.0	41.1	52.8	
9.5	43.0	41.6		9.0	48.9	54.5		9.5	59.4	18.9		9.5	26.2	42.3		9.3	41.1	50.8	
9.1	43.2	25.0		8.5	49.1	13.8	B	8.5	39 26.4	41.7	K	8.6	50 6.0	4.6		9.5	6 8.0	22.7	
9.5	52.7	43.2		9.5	26 2.7	56.0		8.5	31.2	19.5	R	9.5	41.4	18.3		9.0	44.9	46.9	K
8.8	59.3	50.6		9.5	3.0	51.2		9.2	45.4	23.2		9.5	41.6	13.5		9.3	7 22.5	0.6	B
9.5	13 18.4	7.1		9.5	9.6	18.7		8.5	40 1.6	58.3	K	var	55.4	45.6	K	9.0	23.0	13.0	
8.5	30.5	48.0		9.5	34.2	41.7		7.3	13.5	41.1	K	9.2	51 1.0	12.4		7.8	28.4	37.5	K
8.7	46.3	28.9	L	8.5	37.0	26.8	L	8.8	21.4	48.8		8.5	7.3	59.2	L	9.4	35.7	8.3	
9.2	52.6	7.7	B	8.0	27 19.4	55.0	K	8.2	25.9	24.8	B	9.3	46.9	42.6	B	9.5	54.3	44.3	
8.6	14 2.3	50.2		8.5	46.9	44.6		9.5	37.5	55.1		9.5	52 16.7	14.1		8.5	8 1.0	29.3	K
9.4	10.4	14.5	K	8.5	51.7	57.5	K	8.5	44.0	17.8	B	9.5	20.6	29.8		9.5	5.8	6.5	
9.5	35.5	2.2		8.8	28 12.5	29.9		9.5	48.6	10.5		9.2	53 6.4	12.7	K	9.5	17.5	14.1	
9.5	35.6	6.0		9.5	23.5	37.2		8.3	41 6.0	50.8	K	8.8	11.7	12.7	K	9.2	30.2	51.4	K
9.1	53.4	26.4		7.8	29.5	58.5	K	8.6	45.5	51.3	K	9.4	31.0	55.2		9.5	31.7	5.8	
9.5	59.9	11.0		9.5	30.0	50.9		7.8	50.2	58.7	K	9.0	35.0	54.7		9.5	49.0	6.3	
9.3	15 4.5	47.0		8.5	34.9	26.9		9.1	51.5	44.1		9.3	44.8	24.4		8.5	9 4.4	43.4	K
8.3	9.8	48.1	K	8.7	53.8	20.2		8.3	53.8	39.7	G	9.5	47.6	9.2		9.5	16.1	55.5	
9.1	10.0	33.8	K	9.0	29 10.7	29.2		8.0	54.2	59.7	K	9.2	49.9	23.5	B	9.5	50.0	48.4	
9.5	42.0	12.0		9.2	17.4	15.2		8.7	55.5	4.0	K	9.1	54 3.9	26.7	K	9.5	52.2	55.1	
9.3	53.9	45.3		9.5	39.6	49.7		9.0	57.3	27.8		9.0	20.0	34.4	K	9.1	10 1.0	43.5	K
8.9	54.7	51.6		9.0	30 8.2	30.1		7.0	42 1.8	24.4	K	7.0	39.3	30.8	K	9.5	40.0	50.7	
9.2	16 0.3	2.2		9.2	10.9	37.1		9.5	8.2	25.8		9.2	45.8	34.2		9.3	47.5	37.8	
9.2	8.0	13.6		9.5	12.3	59.4		9.1	12.4	23.7		9.5	45.9	42.1		9.5	48.2	31.6	
9.5	17 5.0	6.2		9.3	21.2	33.6		9.4	32.5	16.9		8.8	55 1.6	14.6		8.9	11 21.1	8.5	
9.2	14.4	24.1		9.5	21.6	35.1		9.3	58.0	36.6		8.3	2.5	31.8	K	9.3	35.4	47.2	
9.5	19.0	40.0		9.5	47.1	1.1		9.3	43 0.4	44.1		9.5	26.4	14.7		9.5	38.9	52.1	
9.4	20.3	31.4		9.5	49.5	18.8		9.0	4.7	7.3	K	6.9	27.9	2.6	L	9.5	12 6.5	26.9	
8.6	37.1	11.7		9.5	52.3	9.6		9.1	20.8	18.5		9.5	29.8	29.5		9.5	27.2	53.4	
9.5	57.0	3.5		9.3	52.7	7.1		9.5	37.4	47.0		9.2	59.4	1.0		9.5	36.8	27.9	

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	19h	+43°			19h	+43°			19h	+43°			19h	+43°			19h—20h	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	13 0.5	52.1		9.5	25 37.0	52.5		9.5	35 34.6	33.3		9.3	46 14.0	37.2		9.5	54 53.5	23.8	
9.5	4.9	7.5		9.5	55.1	51.0		9.5	51.5	29.9		8.2	19.9	57.4	K	8.3	56.9	12.0	K
8.9	29.9	54.8		9.5	55.3	42.5		9.5	36 12.4	14.7		9.2	23.6	34.7		8.7	55 12.4	49.2	K
9.5	43.4	42.5		9.2	26 4.0	9.3	K	9.5	50.4	48.8		9.3	30.9	9.1	K	9.2	22.3	9.5	
9.0	48.4	49.8	B	9.2	7.6	35.0		8.1	37 6.8	24.3	B	9.3	36.3	15.5	K	9.5	23.1	22.1	
9.0	55.6	51.5		9.3	8.1	5.0		9.5	8.0	41.8		9.3	36.3	12.0		9.5	37.2	20.0	
9.0	14 14.5	21.8		7.9	23.1	32.0	K	9.5	9.2	35.8		9.5	45.6	29.0		9.5	37.3	26.6	
9.5	16.6	38.5		9.0	37.0	19.5		9.5	24.3	43.3		9.5	48.2	57.8		9.4	39.7	2.4	
9.0	21.0	13.9	B	9.5	51.2	33.9		9.5	27.7	2.9		8.5	58.3	45.2	K	9.5	55.0	48.6	
9.5	42.2	31.0		8.7	56.2	39.2	K	9.5	38.6	53.2		9.1	47 22.3	1.5		9.5	56 12.3	5.6	
9.3	54.4	43.5		9.1	56.7	47.0		8.2	48.3	40.6	K	9.4	38.4	42.4		9.3	28.1	25.7	
9.4	58.7	54.5		9.5	27 5.9	53.1		9.1	38 4.6	21.1	K	9.5	48 0.9	44.3		8.1	28.3	2.5	B
8.7	15 0.9	11.3	K	9.5	17.3	58.4	B	9.2	5.1	34.2		8.1	2.3	37.0	K	7.7	31.7	51.9	K
9.5	10.1	1.1	B	9.3	44.3	11.0		9.1	15.5	20.1	K	8.5	10.2	24.5	L	9.3	42.9	3.0	
7.5	17.4	15.1	K	9.3	54.2	44.0		9.4	25.3	14.6		9.3	30.1	12.3		9.3	45.0	9.7	
9.5	23.7	47.1	B	9.3	56.4	39.8		9.5	37.8	30.7		9.5	42.2	27.8		9.5	53.1	33.0	
9.4	52.0	25.8		8.7	28 1.7	7.5	L	9.5	45.5	58.6		9.5	50.3	3.6		6.8	57 1.5	42.7	K
9.5	52.6	18.6		8.6	9.3	52.4		8.8	39 3.7	44.0		8.5	53.5	44.9	G	9.1	6.9	56.5	
8.9	16 6.0	12.7	K	8.3	11.1	6.9	L	8.7	7.1	38.6		8.3	55.3	51.6	G	9.5	11.2	12.8	
8.6	15.9	18.2	K	8.9	18.0	33.3		9.2	11.2	31.2		9.0	49 9.7	56.1		9.5	13.1	17.0	
8.9	18.3	53.0	B	8.7	29.6	22.1		9.4	26.8	12.1		9.0	11.0	53.4	B	9.5	52.0	13.8	
9.3	17 5.1	6.0		7.5	29 10.2	12.0	K	9.5	45.4	2.9		9.5	14.2	54.9		9.5	58.5	9.7	
9.5	5.4	46.2		9.5	22.9	48.6		9.5	45.9	23.1		9.5	20.9	27.1		9.3	58.8	1.4	
9.5	50.0	33.4		9.4	42.6	20.5		9.5	49.0	29.5		9.5	24.6	54.8		9.3	58 32.1	26.5	
9.5	18 1.5	28.9		9.5	47.1	55.9		9.5	59.0	19.9		9.5	25.5	37.8		9.4	32.2	37.4	
9.5	6.7	57.6		9.4	52.5	12.6		8.5	40 4.1	56.7	K	9.5	35.4	6.2		9.1	33.5	23.2	
8.4	19 3.9	35.8	L	9.2	57.4	25.3	K	9.5	9.4	38.6		9.5	50 7.8	20.1		9.1	49.4	37.8	
9.3	20.3	1.8	B	9.2	30 1.5	3.7		8.6	12.3	43.1	K	9.5	20.5	29.5		9.3	58.2	31.1	
5.6	21.3	6.5	K	9.4	2.8	43.7		8.9	45.7	42.7		9.4	39.6	7.1		8.9	59.8	3.6	K
9.5	32.0	52.4		6.8	8.8	37.4	K	9.5	47.4	37.3		8.7	39.9	21.8	K	9.3	59 2.3	34.5	
8.2	20 14.7	13.6	K	9.1	15.7	21.2	K	8.5	49.9	53.5	K	9.5	43.3	6.6		9.4	7.9	46.7	
9.4	15.4	56.1		8.8	35.4	48.4		8.8	58.8	8.7	K	9.4	48.4	36.9		9.5	12.6	43.9	
9.5	25.8	41.5		8.7	38.5	40.2	K	9.5	59.0	10.3	B	9.1	57.0	51.3		9.3	20.5	40.4	B
9.4	29.6	18.8		9.5	56.7	12.1		9.5	41 25.1	1.4		9.0	51 28.2	16.5		8.9	20.8	14.6	K
9.1	32.2	34.1	B	9.3	31 2.0	52.2		8.2	36.6	35.6	B	9.5	32.3	47.8		9.4	21.3	17.6	
8.5	37.3	21.8	K	9.4	8.6	1.7		8.8	44.2	24.2	K	9.4	36.0	56.7		9.5	26.5	58.0	
9.1	43.3	34.3	K	9.2	21.5	12.9		9.5	54.4	17.3		8.8	54.4	20.5	K	9.5	0 7.0	12.1	
9.5	53.5	49.2		9.5	24.0	4.8		8.0	56.5	24.4	K	9.5	52 2.0	26.3		9.5	15.7	29.1	
9.2	21 2.3	55.7		8.6	32.6	26.5		7.5	42 2.9	59.3	G	9.5	4.9	6.6		9.5	27.6	1.4	
9.4	41.4	1.9		9.5	33.8	34.0		8.7	14.6	45.0	K	9.5	5.0	46.6		9.5	40.0	56.1	
9.5	42.0	23.0		9.5	46.4	46.8		9.1	16.1	23.8	K	9.1	7.6	7.6		9.4	52.3	54.6	
9.5	53.3	23.6		9.5	54.9	51.4		9.5	34.2	4.0		7.9	10.3	52.5	K	9.3	1 13.9	22.7	B
9.3	56.3	34.0		6.9	56.1	23.5	K	9.5	43.7	46.2		9.0	15.0	56.7	K	9.0	21.7	53.8	K
9.1	22 0.7	28.1		9.1	58.3	10.5	K	9.5	43 16.8	53.7		9.4	15.8	21.9	B	9.4	25.4	26.7	
9.0	24.3	27.1		9.2	59.7	7.9		9.5	18.5	19.2		8.2	30.2	52.0	K	9.1	26.9	10.0	
9.3	42.2	14.0		9.2	32 0.0	41.9	K	9.3	21.0	46.5		9.4	46.9	39.3		9.5	35.3	1.2	
9.4	55.4	5.0		8.7	18.2	11.9	K	9.4	26.4	4.8		9.5	54.7	34.0		9.3	41.0	8.7	
9.5	56.3	41.6		9.4	45.0	20.0		8.8	33.1	22.7	K	9.2	59.3	4.1	K	9.5	49.4	45.1	
9.1	23 2.8	2.9	K	9.0	49.8	2.4	K	9.3	35.0	24.9		9.0	53 11.3	59.2	K	9.3	2 3.9	2.3	B
9.0	16.3	53.5		9.4	50.7	5.3		9.1	49.9	5.0		8.0	11.8	59.4	K	9.4	6.5	16.0	
9.5	47.9	34.3		9.5	33 5.9	8.0		9.5	44 8.7	59.2		9.2	23.7	43.4		9.4	8.6	27.8	
9.4	24 20.2	1.6		9.0	13.3	18.6		9.5	22.0	51.9		9.0	27.1	19.6		9.3	23.8	59.1	
9.5	22.9	41.9	B	9.1	33.1	49.2		9.5	43.2	3.5		9.4	42.8	28.2		9.5	35.3	40.9	
9.5	25.0	44.0	B	9.3	59.1	56.8	B	9.5	51.3	13.6		9.5	51.0	3.1		9.5	47.0	6.4	
9.5	29.6	26.7		9.5	34 2.5	56.8		9.4	45 8.3	10.9		9.3	51.1	18.2		7.8	48.6	35.3	B
8.5	30.1	19.0		9.5	3.8	50.8		8.5	21.6	11.4	K	9.5	54 10.3	28.9		9.4	51.3	9.8	
9.0	42.4	11.5	B	9.1	13.7	33.1	K	9.0	22.7	22.1		8.9	17.1	12.2	B	9.5	55.9	23.5	
9.3	46.3	1.6	K	9.1	15.0	44.2		9.3	27.3	38.5		9.5	17.4	18.0		8.0	3 1.7	30.6	B
8.7	25 7.4	45.0	R	7.7	33.4	30.1	K	9.2	39.6	0.7		8.5	34.8	52.1	K	8.7	2.5	33.6	
9.5	36.3	33.8		9.3	53.1	34.5		7.7	44.5	17.3	K	9.3	43.8	11.2		9.5	16.8	41.1	

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	20u	+43°			20u	+43°			20u	+43°			20u	+43°			20u	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	3 24.7	7.2		9.0	13 32.7	31.7		9.5	23 45.6	52.3		9.0	35 43.7	3.5	K	9.5	45 12.4	54.4	
8.2	36.3	20.0	B	9.2	36.7	27.1		9.5	24 29.5	58.2		9.5	58.4	18.0		9.2	14.1	3.2	
9.3	38.0	49.7		9.4	40.5	17.1		9.5	39.9	50.4		8.1	36 7.1	50.3	G	9.4	46 2.9	30.7	
9.4	43.6	10.8	B	9.4	14 7.6	54.6		9.2	59.0	27.5		9.1	12.4	59.9		9.1	16.4	35.3	
8.3	52.6	38.3	B	9.5	23.2	39.8		9.5	25 1.3	18.3		9.4	22.1	21.4		9.4	22.2	27.6	
9.5	57.7	41.7		7.4	40.8	2.1	L	8.7	15.0	41.1		9.3	28.8	55.7		8.3	49.9	12.7	K
8.4	4 1.3	51.0	K	9.4	53.3	52.4		8.9	15.2	13.7		8.3	33.0	19.0	K	8.8	47 2.7	53.4	R
8.7	5.7	53.5	K	9.1	15 2.9	30.8		9.4	30.1	23.5	B	9.4	35.5	53.0		9.4	6.3	36.7	
8.5	31.8	27.3	K	9.2	6.2	52.4	B	9.5	37.3	23.9		9.5	50.6	49.6		9.5	21.4	44.5	
9.5	49.9	12.1		9.4	6.2	44.4		7.0	39.5	49.6	K	9.5	59.8	25.0		9.0	23.8	24.2	
9.1	5 5.3	24.8	K	7.5	36.0	24.1	L	9.5	55.7	27.7		9.4	37 12.2	31.3		9.0	25.7	38.7	
9.5	9.4	9.0		9.5	39.7	49.5		9.5	26 2.2	5.0		9.5	17.6	17.7		9.1	29.9	52.9	
7.2	25.7	31.0	K	8.2	16 10.6	13.0	B	9.5	24.8	18.8		9.4	56.6	39.7		9.0	42.4	11.3	
8.1	31.8	1.5	K	9.3	16.6	39.0		9.2	28.3	33.8	K	9.2	38 1.4	16.5		9.5	49.3	33.4	
9.4	33.6	59.4		9.3	18.2	44.9		9.5	31.5	37.4		8.7	5.3	33.1		5.4	48 7.7	50.3	K
9.2	57.9	26.3		7.4	19.0	7.7	B	9.5	34.6	50.0		9.3	8.4	59.9		9.5	12.4	2.6	
9.2	6 0.5	33.6		9.2	28.7	26.9		9.1	36.2	59.9		9.4	11.6	54.9		9.4	24.2	5.2	
8.5	38.4	44.7	K	9.3	35.3	32.3		8.5	54.5	37.2	K	9.3	14.7	50.3		9.3	26.1	43.7	
9.5	40.0	51.4		9.1	40.9	40.0		9.5	55.0	47.8		9.5	39 14.3	44.2		7.5	45.6	50.2	K
9.5	43.4	38.0		9.2	17 12.5	19.2	K	9.3	56.3	28.7		9.0	14.7	50.4		9.5	49 17.3	21.0	
9.5	49.4	27.2		8.7	15.5	43.7	B	9.5	27 3.7	23.9		8.6	18.0	26.5		9.5	50 3.8	21.9	
9.4	51.2	55.9	B	9.5	16.3	51.5		9.5	8.2	25.6		8.6	22.6	4.9		7.5	5.3	14.4	B
9.5	7 4.5	26.9		9.5	19.0	20.8		9.4	12.7	14.7		9.1	45.8	0.5		8.4	36.6	7.2	B
9.5	13.3	8.0		9.3	22.6	7.9		9.5	14.8	1.2		9.4	48.0	53.7		9.5	41.5	11.7	
9.0	16.1	47.6	K	9.3	28.3	11.5		9.3	21.4	17.3		9.5	50.4	28.5		8.6	50.4	3.6	
9.5	36.2	4.4		9.2	37.8	8.5	K	9.5	47.2	34.4		8.7	40 7.1	6.0		6.7	50.9	49.2	P
9.4	36.9	2.8	B	9.2	39.9	16.5		9.5	49.8	48.6		9.5	9.0	18.1		7.0	51 13.1	20.8	B
7.7	8 33.7	22.5	G	9.3	42.6	4.1	K	9.0	54.5	38.0	K	9.0	12.8	51.8		9.4	17.0	46.2	
8.7	35.4	44.0		9.5	47.1	42.7		9.5	28 6.2	34.9	B	8.9	22.6	6.5	B	9.5	31.4	1.5	
9.2	58.8	37.3		9.4	18 5.2	46.5		9.0	11.8	38.8	K	9.2	25.7	0.7		9.3	48.6	23.0	
9.5	9 6.4	46.7		9.3	6.6	56.3		9.4	18.1	9.1		9.5	31.8	44.1		9.4	51.0	44.7	
9.5	7.2	47.1		9.5	10.9	48.3		9.4	22.2	16.2		9.4	39.8	32.1		9.5	52 0.9	57.2	
9.5	12.8	34.4		9.5	48.6	2.0		9.5	25.1	16.5		8.8	41 14.0	18.6	K	9.5	23.7	21.8	
9.1	26.3	50.8		9.5	19 13.7	10.7		9.5	37.7	29.0		9.5	42.0	16.1		9.5	30.8	59.0	
9.5	27.4	12.4		9.5	14.7	0.3		9.0	38.9	19.0	B	8.7	44.2	23.2	B	8.3	36.2	37.2	K
9.5	31.2	30.7	B	9.5	20 9.6	10.5		8.6	50.6	1.4	K	9.2	47.6	26.7		9.5	53 0.1	18.2	
9.5	44.6	27.4		9.3	13.8	18.8		9.3	29 0.1	21.6		9.5	56.0	17.8		6.0	8.2	54.4	K
9.1	45.3	6.5		8.8	21.3	27.1		9.3	5.3	39.7		9.5	42 0.7	19.2		9.5	27.4	58.8	
9.0	10 21.1	34.9		8.7	40.0	12.2		9.3	6.8	19.8		9.5	8.4	55.6		7.8	33.1	51.3	B
6.7	33.8	33.6	K	8.9	44.7	29.7		9.0	7.8	44.0		9.3	13.1	13.4		7.0	44.7	29.5	L
6.8	37.7	41.9	K	8.3	21 2.1	29.8		9.5	44.6	4.1		9.3	18.8	55.5		9.5	49.4	44.3	
9.5	46.8	46.0		8.9	11.3	0.5		7.4	30 17.0	54.5	K	9.5	34.9	7.8		7.3	54 23.0	40.0	L
7.5	48.6	12.5	K	9.5	14.8	56.5		8.9	31 8.5	31.6		9.5	38.2	36.9		9.5	55 11.9	16.7	B
8.9	57.2	57.3	B	9.5	34.4	17.4		8.2	28.4	33.2		9.4	53.4	26.4		9.5	14.3	32.6	
9.5	11 3.3	35.8		9.4	39.1	20.4		9.3	29.8	1.7		9.2	59.5	24.1		9.5	55.8	25.4	
8.5	16.3	52.0		8.8	48.6	24.0		9.2	40.3	47.1		9.4	43 0.2	51.1		7.8	59.7	9.2	K
9.5	21.4	59.8		9.5	57.1	41.5	B	9.3	32 15.6	46.5		9.5	0.2	46.6	B	9.5	56 6.3	14.6	
9.5	26.5	33.4		8.5	22 4.4	40.4	K	9.3	16.4	18.9		8.9	9.5	32.3	R	9.5	29.5	4.2	
7.4	39.7	9.6	K	8.1	11.0	35.9	K	9.3	17.0	33.7		8.8	33.5	46.7	K	7.0	34.8	36.9	L
8.2	39.8	25.2		9.5	30.2	37.7		9.3	44.5	49.8		8.7	55.4	40.3	K	9.5	55.1	49.9	
9.0	59.2	47.7		9.4	32.1	2.2		9.2	33 14.3	51.9	B	8.8	59.6	21.6		9.3	57 13.0	14.0	
7.5	59.6	14.2	K	9.3	40.4	43.2		6.8	16.2	49.4	K	8.3	44 23.4	14.1	B	8.5	14.6	34.3	
8.4	12 4.7	9.6	K	9.2	42.0	8.6		8.8	26.3	19.1		8.5	23.9	31.6	K	9.5	23.1	24.7	
9.5	6.0	25.1		9.3	43.6	0.7	B	9.2	26.9	37.3		9.5	28.0	13.4		9.5	58 5.5	59.1	
9.4	6.0	27.1		9.5	47.1	40.7		9.2	27.5	52.1		9.3	29.0	23.8		9.5	9.4	44.3	
9.3	14.8	54.9		8.8	57.2	59.4		8.5	34 2.1	17.7	K	9.4	31.5	5.8	B	9.4	39.9	30.0	
9.2	42.2	13.6		9.0	59.7	29.9		9.4	35 23.6	11.0	B	9.5	41.4	22.3		7.5	42.7	1.2	B
8.3	52.0	46.6	K	9.5	23 19.0	59.4		9.5	25.0	12.4		9.3	55.7	54.6		9.5	59 16.0	50.2	
9.5	13 12.5	45.6		9.5	31.7	13.0		9.3	39.6	12.6		5.5	57.7	30.8	K	9.5	16.2	55.5	
9.5	27.3	53.3		8.0	33.1	2.5	K	9.5	43.0	44.5		9.0	45 4.6	12.2		4.0	40.7	21.1	

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	21ᵘ	+43°			21ᵘ	+43°			21ᵘ	+43°			21ᵘ	+43°			21ᵘ	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	0 11.8	27.6		9.2	10 24.8	58.4		9.5	20 35.1	2.9		9.4	30 19.8	43.1		9.3	40 14.7	12.4	
8.8	13.0	5.8		9.1	29.2	53.2		7.8	35.1	46.5	K	9.0	25.6	24.1		9.4	30.2	35.9	
9.5	29.7	42.5		9.2	30.7	54.2	B	9.5	45.7	13.8		9.3	36.0	17.7		9.5	44.3	11.3	
9.5	47.2	47.5		9.1	34.4	26.7	K	9.5	48.0	19.7		8.5	37.2	47.1	G	9.5	49.1	36.7	
8.2	58.4	13.1	K	9.4	47.0	22.1		9.4	56.4	11.5		8.4	41.7	40.1	G	9.5	41 4.3	8.3	
8.3	1 27.8	11.9	K	6.3	55.8	37.9	K	9.5	59.3	32.0		9.0	31 13.8	55.5	K	8.8	12.2	27.2	
9.5	38.7	22.7		9.4	57.3	12.1		9.4	21 11.2	58.6		9.5	18.2	44.7		8.9	45.2	28.6	
9.2	54.6	17.4	B	8.4	11 18.3	3.4	K	9.1	15.1	6.5		9.3	30.4	30.2		7.2	59.1	20.3	K
9.2	57.8	1.9	K	9.4	43.8	27.6		7.3	17.6	11.3	K	8.7	54.5	24.4	K	9.5	42 6.9	10.8	B
9.4	2 9.0	15.4		9.0	44.8	4.1	K	9.0	18.3	58.8		9.4	32 8.8	12.3	B	7.8	23.0	40.2	K
9.5	13.3	43.1		9.5	52.3	22.5		9.5	43.7	13.8		9.5	51.2	7.1		8.9	37.8	55.2	K
9.5	32.3	52.9		9.5	12 12.1	9.5		9.5	49.1	45.2		9.5	33 12.6	40.1		9.3	43 2.2	17.4	
9.5	33.8	19.6		9.5	14.7	13.1		9.5	50.4	25.0		9.0	17.0	6.4		9.5	20.0	49.8	
9.4	49.5	37.7		9.4	38.0	34.4		9.4	22 24.2	15.1		8.7	19.8	14.3		8.8	34.4	43.8	
7.8	58.4	9.8	L	9.4	39.6	15.2		9.5	34.9	9.6		8.8	31.5	41.7		9.3	38.9	21.6	
9.5	3 19.6	7.9		9.1	56.3	9.5	B	9.5	38.3	33.5		8.6	34.9	32.2	K	9.0	42.3	53.2	K
7.8	21.0	14.7	K	5.3	13 3.9	20.2	G	9.5	38.6	53.1		8.2	38.7	23.5		8.5	45.1	32.1	
9.5	37.0	2.5		8.8	11.4	28.6		8.7	50.0	21.0		9.3	49.8	39.9		9.5	44 7.9	51.3	
9.4	41.4	19.2		8.9	17.3	37.7	K	9.5	23 2.5	57.1		8.3	34 2.5	47.3	K	9.5	10.0	24.9	
9.4	47.7	2.3		9.5	26.4	7.7		8.4	23.3	59.2		9.5	3.6	56.5		8.3	15.1	17.4	K
9.1	57.1	7.7		9.5	28.1	14.2		7.0	46.6	42.3	G	9.5	11.0	10.4		6.8	26.6	12.6	K
7.1	4 35.2	36.6	B	9.2	33.7	36.9	K	9.1	24 13.6	2.7		6.7	18.6	46.8	K	9.5	30.5	41.1	
8.5	35.9	46.3	S	9.1	55.6	21.3		9.5	17.3	44.2		9.5	22.5	8.6		9.5	54.6	10.2	B
8.2	45.4	24.2	K	9.5	58.4	34.5		9.5	40.4	26.8		9.0	42.1	17.1		9.5	45 7.5	7.0	
8.0	54.9	24.4	K	9.1	14 11.3	7.6		9.5	25 3.7	20.1	B	9.0	44.6	13.6		8.0	14.7	50.3	K
9.4	5 23.2	42.6		9.5	50.0	41.8		9.5	3.7	21.2		8.9	35 6.1	33.1	K	9.5	28.0	31.5	
9.5	29.6	35.3		9.1	53.4	44.8		9.3	9.5	1.4		9.5	15.2	47.9		7.0	29.8	45.4	K
8.2	30.0	42.0	K	9.5	16 6.1	15.3		9.5	14.8	58.1		9.5	30.8	24.3		9.1	30.0	26.1	
9.5	33.2	36.5	B	9.5	40.0	32.6		9.5	15.0	35.0		9.5	40.9	44.5		7.6	34.8	40.5	K
9.3	51.7	10.0	K	9.5	42.3	9.3		9.5	33.7	35.2		9.3	46.6	48.9	B	9.5	37.1	8.7	
9.5	54.4	27.6		9.0	52.9	16.7		8.0	40.3	26.1	K	8.9	49.7	50.3	K	9.5	59.8	57.0	
9.5	6 5.7	3.3		9.5	57.7	53.1		9.5	41.0	10.6		8.7	36 5.4	19.7	B	8.5	46 7.5	7.7	
9.3	10.5	16.4		9.4	17 0.1	24.0		8.0	41.8	23.2	K	8.7	6.5	37.3	K	9.4	14.8	17.2	
9.4	24.4	20.1		9.0	6.6	9.2	K	9.3	58.7	15.0	B	8.7	6.8	41.6	K	8.0	27.5	6.4	K
9.4	26.6	29.9		9.4	10.6	31.7		8.5	26 6.7	42.6	G	9.5	21.6	14.9		8.2	45.5	6.8	K
9.5	27.7	41.3		9.4	15.7	30.9		8.7	12.5	35.4	G	9.4	29.1	31.6		9.5	55.3	53.4	
9.3	32.2	0.1		8.4	19.5	7.5	K	9.0	31.4	5.8	K	9.0	29.4	33.9	K	9.4	47 24.4	11.7	
9.2	33.6	32.8	B	8.9	20.4	59.5	K	9.5	31.7	48.4		9.5	36.3	55.0		9.3	57.0	19.6	
9.5	50.8	19.3		8.9	35.6	39.9		9.5	40.0	59.8		9.5	49.8	14.5		9.3	57.6	6.4	
9.5	55.6	36.8		9.5	51.9	38.0		9.4	49.3	27.7		9.2	37 1.2	3.4		9.0	58.1	9.8	K
9.5	56.5	14.4		7.0	56.8	54.4	K	9.1	57.0	2.8	K	9.5	14.4	59.1		9.3	48 26.5	56.8	
7.2	7 10.4	56.2	B	9.5	18 8.4	18.4		9.5	27 1.0	57.7		9.5	19.9	11.8		9.5	27.4	11.2	
8.0	18.8	28.4	B	9.1	17.9	53.7		9.5	15.5	58.3		9.4	38.5	20.9		9.5	37.5	59.1	
9.1	23.4	53.8		8.8	29.7	3.7	K	9.4	35.4	11.0		8.1	40.0	40.7	K	7.8	46.0	22.1	K
9.5	28.5	25.1		9.3	42.8	57.3	B	9.0	57.7	42.6		8.8	55.8	24.8	B	9.5	54.1	6.6	
9.2	36.7	19.4		8.8	51.6	17.0	K	9.5	28 9.5	59.5		8.4	56.0	52.8	K	9.5	49 5.8	33.2	
9.3	41.0	37.7		9.5	58.1	53.0		9.2	13.3	54.7		9.4	38 12.5	8.1		7.0	28.7	43.9	
9.5	43.0	50.5		8.0	19 13.4	40.0	K	9.5	32.0	34.5		9.0	24.6	2.7		9.5	29.3	56.4	
8.5	45.1	1.8		9.5	19.2	26.3		9.5	33.7	53.6		8.9	35.0	2.7		8.8	51.6	16.5	
7.5	49.4	16.8	G	8.8	29.0	13.2	K	9.5	49.7	15.4		8.6	40.7	8.6		9.5	50 38.8	42.2	
9.5	8 17.3	57.0		9.5	31.7	34.2		9.2	29 12.0	54.0		9.1	48.2	58.7		9.3	47.7	14.3	B
8.3	27.3	6.8		9.5	34.4	43.0		9.4	19.4	27.6		9.3	53.4	5.4		9.1	53.3	29.8	
9.2	32.9	40.1		8.4	37.1	49 4	K	9.5	25.9	7.0		9.3	55.4	6.6		9.1	57.2	6.8	
8.5	35.5	24.3	L	9.3	39.8	48.5	B	9.4	26.0	27.6		9.2	39 4.5	6.2		9.0	52 29.5	35.6	K
9.0	9 11.7	2.6		8.4	42.0	46.5	K	6.7	33.2	3.6	G	9.2	9.0	44.3		9.3	32.3	40.8	
9.5	42.1	48.6		9.0	57.9	27.6		9.2	36.8	17.1		9.5	28.7	50.0		7.5	35.0	28.2	K
9.2	45.5	11.9		9.5	59.1	29.1		9.5	41.4	50.6		8.2	41.9	16.0	B	9.2	42.6	34.6	K
9.4	51.8	25.0		8.9	59.4	20.8		9.5	44.3	36.7		9.3	52.8	12.1		8.0	47.0	59.8	K
9.0	53.0	11.9	K	9.4	20 17.0	54.0		8.5	54.7	19.8		9.3	53.0	6.0		9.0	53 11.0	33.7	K
9.5	10 12.1	17.6		9.3	34.7	49.4	K	8.5	57.6	15.8		9.5	40 0.0	32.0		9.5	18.3	54.6	

4101—4160				4161—4220				4221—4280				4281—4340				4341—4400			
	21h—22h	+43°			22h	+43°			22h	+43°			22h	+43°			22h—23h	+43°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	53 25.5	39.1		9.2	8 42.5	55.3		9.5	25 23.7	25.2		9.3	36 49.2	55.1		6.7	49 15.3	31.8	G
9.5	25.6	3.9		7.0	9 0.8	3.2	L	9.5	26 5.3	47.0		9.5	51.3	0.3		9.3	23.8	31.3	
9.2	25.6	23.5		7.5	26.7	1.9	L	8.9	18.0	41.5	K	9.5	58.9	24.5		9.5	30.1	55.4	
9.2	38.8	56.0		9.4	31.4	8.6		9.5	20.0	16.0		9.5	37 2.1	28.5		9.5	54.2	56.6	
8.6	54 12.7	30.0	K	7.3	45.7	11.9	K	9.0	27.2	50.4		9.3	4.4	4.3		9.0	50 9.6	7.0	K
7.6	15.7	51.2	L	9.1	10 2.6	34.8		9.5	35.3	9.2		9.5	5.0	3.0		9.5	22.1	29.0	
9.5	42.6	6.5		8.7	11 33.3	59.7	K	9.0	54.2	57.4		9.0	12.9	59.4		9.5	32.6	16.2	
7.5	46.6	26.4	K	9.4	13 15.3	34.3		9.5	27 9.1	1.0		7.5	16.2	46.4	K	9.5	51 1.4	22.7	
8.5	48.6	21.6	K	9.4	39.7	30.3	B	9.5	51.0	0.2		8.4	23.7	6.2	K	9.5	11.0	10.6	
9.5	55 14.0	51.2		9.4	44.9	18.3		9.1	58.7	24.2		9.2	27.6	35.5		8.5	12.3	59.7	K
8.1	30.3	58.5	K	9.1	57.4	15.9	K	9.1	28 7.1	47.4		9.5	28.1	17.1		9.5	35.5	46.4	
8.6	36.6	10.4	K	9.3	14 13.0	13.1		9.3	31.0	11.8		9.5	36.9	58.9		9.5	50.1	34.8	
9.5	50.2	24.1		9.3	31.2	20.8		9.5	33.0	30.0		9.0	38 8.2	17.4		9.1	56.7	26.3	
9.5	59.8	13.0		9.3	39.1	50.8		9.5	35.2	3.4		9.3	15.8	52.9		8.8	52 0.4	24.1	
9.4	56 9.0	49.8		9.4	56.1	22.0	B	9.2	38.1	42.8		9.3	18.3	45.8		7.0	11.8	3.7	L
7.8	13.6	37.4	K	9.5	59.5	38.7		9.1	40.0	34.2		9.3	22.7	36.6		9.5	28.0	51.1	
9.2	33.2	31.0	B	9.0	15 25.7	43.5		9.4	40.4	11.8		9.4	35.6	4.5		9.0	32.2	11.7	
9.5	39.3	30.7		8.0	51.3	1.1	K	9.5	53.3	31.5		7.1	39 2.0	59.7	K	9.3	47.5	36.5	
6.0	57 7.1	57.2	K	9.1	58.1	5.1		8.4	29 20.0	59.9	K	8.8	8.6	35.3		7.7	55.4	8.4	K
8.5	32.1	57.9	K	9.3	16 2.8	37.7		9.3	30.7	9.0		6.0	44.0	47.2	K	9.1	58.0	22.3	
7.6	58 0.7	53.9	K	9.5	14.4	56.4		9.3	37.3	48.9		9.3	50.2	16.3		9.5	59.1	46.1	
7.3	16.6	38.7	K	8.5	35.4	53.8		9.4	59.4	33.8		8.0	53.4	6.5	K	8.1	53 7.7	51.4	G
9.2	59 1.8	36.1		9.5	35.4	10.7		9.4	30 2.5	42.5		9.4	40 7.6	31.9	B	8.8	9.3	27.5	
9.0	16.2	21.2		9.3	59.6	33.1		9.0	3.4	17.1	K	9.5	11.3	32.7		9.3	20.2	47.3	
9.5	23.5	59.1	B	8.4	17 8.9	58.5		9.5	4.4	15.8		9.5	35.5	35.1		9.3	20.7	32.5	
7.2	59.7	35.1		8.5	15.2	51.0		9.5	15.5	45.3		9.1	41 7.0	47.7		9.1	27.1	10.2	
9.2	0 1.7	27.5		9.1	21.6	58.0		9.3	23.4	22.1		9.5	31.5	5.0		9.5	33.3	56.3	
7.8	5.7	45.2	K	8.8	28.3	33.6	K	9.3	30.1	28.9		9.3	52.0	13.1		9.4	54 2.2	39.1	
9.2	6.8	9.4		9.5	40.2	5.8		9.1	38.5	1.1	K	9.4	42 4.9	10.7		9.1	4.6	46.8	
8.1	15.5	56.3	K	9.5	53.2	13.5		9.4	44.6	37.1		9.0	12.9	55.4		9.5	24.5	51.5	
9.4	54.2	17.4		8.9	18 6.0	17.9	K	9.3	50.3	47.9		9.5	37.7	4.9		7.5	39.7	25.4	G
8.3	57.2	31.4		8.6	8.3	42.5	K	9.4	53.2	51.8		9.5	39.8	27.5		8.7	40.2	43.1	K
9.5	1 12.7	10.5		8.5	16.9	56.0		9.2	31 1.6	15.6	B	9.5	43.7	9.2		9.0	55 10.7	40.1	
9.3	12.9	2.4		9.5	19.5	6.6		9.3	11.2	3.6	B	9.3	46.3	4.6	B	8.5	15.5	20.8	G
7.3	59.6	30.3	K	9.5	30.4	54.4		8.2	16.5	46.4		8.0	43 0.6	4.8	L	6.2	34.4	48.0	K
9.5	2 4.3	22.0		9.3	57.8	27.0		9.4	38.0	2.4		9.5	1.8	34.4		9.4	42.0	16.9	
9.5	39.0	8.0		7.9	57.9	48.4	K	9.0	54.0	45.6	B	9.4	44 19.9	9.0		8.9	56 4.2	48.2	K
8.5	48.2	50.2	K	9.3	19 29.0	9.1		7.0	32 16.2	55.2	L	9.2	24.0	40.9		6.1	9.1	16.6	K
9.5	3 29.3	29.9	B	9.1	33.9	9.5	K	9.5	22.3	13.7		9.5	26.1	32.7		9.1	17.0	25.9	B
9.2	30.8	46.4		8.8	47.0	54.4		6.7	25.4	33.5	G	9.3	32.3	48.3		9.5	17.3	26.7	
9.5	37.4	55.4		9.5	20 12.5	55.5		9.1	59.6	54.0		9.0	35.7	18.2		9.0	22.5	47.2	
8.0	4 1.1	54.4	K	9.0	26.1	55.5	K	8.8	33 12.2	57.2		9.5	36.8	54.6		9.5	57 8.3	56.9	
8.8	5.7	28.9		9.5	37.7	48.8		9.5	37.9	4.0		9.3	48.1	23.5		9.5	57.7	26.3	
8.5	13.2	56.7	K	8.9	21 7.0	9.0		9.5	43.5	15.6		9.5	45 38.2	0.3		9.5	58 18.2	28.2	
8.0	16.3	21.6		9.2	8.3	37.3		9.5	34 9.5	2.8		8.0	56.1	30.7	K	9.4	25.0	58.1	
8.2	18.8	46.2	B	9.1	22.0	45.3		4.8	10.8	30.6	K	8.0	46 9.9	1.1	K	9.5	36.3	47.7	
9.4	20.6	8.2		9.5	39.6	52.5		9.5	36.5	36.3		9.5	22.4	14.9		9.1	59 1.4	37.9	
9.4	49.1	5.9		7.0	53.5	22.8	K	9.2	46.9	51.8		9.5	29.2	25.4		7.6	7.4	6.2	K
9.4	5 44.4	3.2		9.0	22 6.8	2.0	K	8.2	35 13.7	41.3	K	8.5	34.3	42.4		9.2	37.9	23.3	
8.9	6 27.7	12.9	K	9.0	7.8	58.1		9.0	20.4	14.6	K	9.3	47 10.2	32.9		9.5	43.3	2.9	
9.5	42.0	24.8		9.5	14.5	49.0		9.5	27.6	44.4		6.0	10.4	58.8	K	7.8	44.2	40.2	L
8.6	56.3	36.5		9.2	49.0	47.5	B	9.2	41.1	4.0		9.4	29.1	29.4		9.3	0 2.4	42.4	B
8.8	7 7.9	55.4	K	9.3	23 8.4	54.7		9.4	48.8	40.2		8.7	35.1	46.9	K	9.2	6.1	58.3	
9.5	36.4	29.3		9.4	22.5	40.5		9.2	52.1	2.0	K	9.3	53.5	45.1		8.0	13.5	31.4	
9.5	40.5	45.0		9.5	37.7	26.6		9.1	36 2.7	2.0		9.5	48 23.5	57.9		9.5	14.8	38.7	
9.5	41.2	37.6		8.7	24 1.0	40.5	K	8.8	13.4	15.5	K	8.6	32.0	41.2		8.0	19.8	43.5	K
9.5	54.6	55.8		9.5	5.7	7.5		9.5	15.6	15.5		9.5	47.5	8.0		9.5	24.7	56.4	
9.4	8 23.9	41.6		9.4	12.6	49.7		9.4	30.7	13.8	B	9.5	54.5	38.6		9.0	1 0.8	48.7	
9.5	38.9	7.4		9.2	17.5	42.5		8.6	35.9	57.6		9.4	58.2	12.9		6.5	32.1	46.5	K
9.0	41.6	33.6	K	9.5	58.6	26.9	B	9.3	45.8	57.3		9.3	49 15.1	7.9	B	8.8	40.1	18.5	

4401—4448			
	23u	+43°	
m	′ ″	′	
9.5	2 11.6	20.1	
8.5	12.5	5.9	K
9.3	39.1	34.6	
9.5	52.5	2.1	
9.5	3 1.3	31.8	
9.5	4.1	21.5	
9.0	11.6	59.5	
9.5	44.8	22.8	
9.5	4 3.9	2.4	
9.2	8.2	59.8	
9.5	55.0	45.6	
7.8	5 13.6	33.0	B
9.1	24.7	23.1	
9.2	39.6	58.0	
9.5	6 59.8	0.6	
7.8	7 5.6	49.8	
9.2	7.8	50.4	
9.2	9.3	43.9	
9.0	15.1	49.3	
9.3	51.3	18.6	
9.4	57.0	43.8	
9.5	8 24.4	49.4	
9.4	29.3	14.8	
9.5	9 7.2	37.3	
9.2	39.3	15.2	
9.5	39.9	2.1	
9.1	43.2	17.0	
9.5	52.3	51.9	
9.4	10 12.6	41.9	
9.5	14.4	58.4	B
8.5	18.6	7.2	K
9.2	29.7	1.4	
9.4	11 18.8	6.3	
9.0	28.0	47.1	
9.4	34.2	26.6	
9.4	13 5.8	29.0	
9.4	8.6	12.1	
9.2	32.7	26.6	
7.9	51.7	47.2	B
6.3	53.3	20.2	K
9.5	57.8	33.1	
9.5	14 10.9	51.8	
9.2	15.6	32.6	B
9.5	15.9	54.6	
7.3	36.8	16.1	K
9.1	15 27.0	56.8	
9.5	16 6.0	47.0	
9.5	8.4	23.7	

4449—4496			
	23u	+43°	
m	′ ″	′	
9.5	16 37.0	50.9	
9.5	47.3	37.1	
9.2	17 12.8	4.1	
9.2	33.4	58.0	
9.4	34.8	48.9	
9.3	39.9	19.9	
9.3	42.6	9.8	
8.5	50.4	29.5	
9.5	18 13.9	58.5	
9.5	56.6	34.4	
9.0	19 1.3	51.3	
9.5	42.4	3.1	
9.5	57.5	40.5	
8.0	20 22.5	4.0	K
9.5	23.4	17.1	
9.5	41.9	28.9	
7.0	45.1	58.7	K
9.3	21 40.4	47.8	
9.4	47.0	41.7	
9.3	47.1	19.9	
9.3	53.6	58.1	
9.5	22 31.9	36.9	
7.8	53.8	9.2	G
9.5	23 7.5	45.5	
8.0	10.9	37.2	K
9.2	34.4	18.2	
8.1	41.3	10.5	G
9.3	24 5.7	40.4	
9.5	16.9	51.8	
9.3	17.1	32.3	
9.5	19.0	4.8	
9.5	45.9	26.5	
6.8	50.9	16.1	K
8.1	25 0.6	1.1	K
9.3	29.8	57.3	
8.0	41.5	51.1	K
9.5	47.7	28.5	
8.5	26 20.4	51.5	K
9.5	35.3	35.1	
9.5	39.0	2.6	
6.9	55.4	6.2	B
9.0	27 10.6	11.9	K
9.3	12.4	44.5	
9.1	13.8	6.1	B
9.1	33.4	12.2	B
9.5	43.8	15.5	
9.5	51.9	19.7	
9.5	28 8.9	45.8	

4497—4544			
	23u	+43°	
m	′ ″	′	
7.3	28 19.8	19.5	K
9.5	38.5	56.1	
9.5	52.9	30.6	
9.2	29 3.8	12.7	
9.5	21.4	18.9	
9.0	28.5	47.2	K
9.5	40.3	13.7	
9.5	49.9	18.8	
9.5	30 0.4	25.7	
9.2	9.0	40.9	
8.8	12.4	4.4	
6.3	27.8	37.2	G
9.3	31 2.0	10.3	
9.4	9.1	53.5	
8.8	12.4	14.7	
8.4	16.3	27.8	L
9.3	17.1	52.1	
8.5	18.7	53.8	K
8.4	28.3	52.7	K
9.0	40.9	36.8	
9.5	50.6	36.1	
9.0	32 6.5	7.1	
8.7	7.3	18.1	
9.5	19.7	45.2	
8.2	49.7	0.1	K
4.7	33 16.3	31.3	K
9.1	25.2	16.3	B
9.5	34.8	50.0	
9.5	45.9	56.1	
8.8	59.1	35.4	
9.4	34 26.6	4.4	
9.5	29.7	41.3	
9.5	51.3	23.0	
6.8	35 7.0	58.0	K
8.5	58.1	36.1	B
9.5	36 18.9	27.5	
8.9	28.9	40.9	
9.4	37 3.0	51.7	
9.1	15.1	8.2	
9.4	17.2	55.0	
8.8	40.4	11.3	K
9.5	43.9	37.2	
8.7	38 5.3	29.6	
8.6	36.4	50.8	K
9.5	39 2.1	17.1	
8.4	4.7	24.4	K
9.2	14.3	3.3	
9.1	23.0	38.2	

4545—4592			
	23u	+43°	
m	′ ″	′	
9.1	39 28.9	9.5	
8.3	34.5	5.5	K
9.4	58.4	49.0	
9.5	40 28.9	46.5	
9.3	55.8	55.2	B
9.3	41 7.1	23.2	
9.5	9.0	56.5	
9.4	11.3	58.2	
7.8	34.2	35.1	K
9.5	38.4	37.8	
9.4	49.5	18.0	
9.5	42 20.9	25.7	
9.0	43 16.9	1.3	
9.5	25.7	5.0	
8.5	50.9	48.8	K
8.5	54.4	44.4	K
9.1	56.2	4.4	
9.3	44 21.9	30.5	
9.5	25.9	31.6	
8.9	45 34.3	6.2	K
9.5	44.4	35.0	
9.1	53.6	25.1	
9.3	55.9	28.9	
9.4	56.4	14.0	
9.5	46 32.6	3.6	
7.0	35.4	44.5	K
9.0	47 10.6	18.9	K
9.4	18.9	43.1	
8.9	37.9	13.3	K
8.8	46.2	7.1	K
9.2	48 24.3	4.4	
9.4	45.8	20.0	B
9.4	46.0	17.0	
9.4	49 8.1	20.1	
9.2	10.9	3.0	
9.5	18.4	56.6	
9.5	38.3	37.3	
8.9	41.2	48.9	B
9.5	50 8.1	9.3	
9.3	17.4	20.9	
9.3	25.9	49.3	
8.7	26.8	5.5	
9.4	31.6	16.1	
9.2	48.2	40.0	
8.8	50.3	24.1	
8.8	51 21.1	36.9	
8.4	36.3	56.2	
8.0	38.4	45.5	K

4593—4638			
	23u	+43°	
m	′ ″	′	
9.2	51 46.1	23.7	
9.3	49.3	57.9	
8.2	50.4	3.2	K
9.2	52 2.6	47.3	B
9.4	7.4	51.8	
9.4	20.0	49.3	
9.2	40.6	36.8	B
8.8	42.6	23.7	
9.1	53 37.5	5.8	
9.5	38.2	42.8	
9.1	48.3	58.0	
9.3	54 2.3	53.4	
6.6	9.9	52.1	K
9.0	33.4	16.5	K
7.8	42.9	43.1	K
8.6	46.8	37.1	L
9.5	55 22.5	55.4	
9.5	24.1	51.8	
9.5	25.3	45.8	B
8.7	27.6	2.3	K
8.5	38.5	4.4	K
9.5	40.6	21.6	
9.5	56 0.0	50.3	
8.5	13.5	28.5	
9.3	24.8	28.1	
9.4	35.0	52.0	
9.5	46.8	53.6	
8.7	50.6	0.0	K
9.5	57 8.3	11.9	
8.7	9.3	53.8	R
9.5	14.0	11.4	
8.1	25.4	9.6	K
9.3	30.0	6.0	
9.5	58 7.3	24.7	
8.0	14.4	39.9	K
9.0	22.3	0.3	
7.3	32.0	56.1	K
9.5	42.2	31.0	
7.4	44.6	15.4	
9.2	53.8	57.3	
9.5	59 1.9	37.1	
9.0	19.8	3.9	K
8.6	20.0	48.9	
9.5	20.4	27.8	
9.0	31.3	0.5	
9.5	45.7	47.1	

Zone +44°

1—40				41—80				81—120				121—160				161—200			
	0h	+44°			0h	+44°			0h	+44°			0h	+44°			0h	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	0 17.8	19.0		9.5	6 38.8	54.5		9.5	16 23.8	23.1		9.5	27 16.0	28.4		9.5	38 15.8	25.3	
9.2	38.4	5.5		9.5	39.0	44.6		9.5	27.1	38.5		9.2	18.6	2.1		7.5	26.3	38.3	L
9.5	39.4	44.1		9.3	42.9	1.4		9.3	29.3	57.3	A	9.4	23.0	9.5		9.5	28.3	28.8	
9.0	43.2	4.0		8.5	7 0.6	3.8		9.5	30.3	31.1		9.4	26.2	39.2		9.0	45.0	1.0	
8.9	58.3	12.5		9.4	8.3	27.3		8.9	17 18.9	53.2	A	9.5	46.7	32.7		9.2	39 14.6	8.2	
8.2	1 0.8	9.9	K	8.3	41.2	22.6	K	8.8	25.5	52.9	A	9.2	28 59.0	42.0		9.0	17.2	30.0	
9.1	1.3	16.6		8.0	46.0	43.3		9.5	36.1	9.4		9.4	29 9.4	1.7		9.1	22.9	0.2	
9.5	8.5	33.5		8.0	48.3	12.2	K	9.1	49.2	38.8		8.5	43.2	47.9	K	9.5	40 23.4	58.1	
9.0	21.3	55.0		9.4	8 2.5	18.4		9.3	18 10.2	17.3		9.2	51.6	11.4		8.1	31.4	10.6	K
8.9	25.5	26.6		8.0	8.7	43.3	K	9.3	58.1	44.1		9.4	30 9.3	39.6		9.1	36.8	30.0	K
9.4	33.3	4.8		8.5	32.4	37.6	K	9.3	19 15.1	52.4		9.5	21.5	56.7		9.1	48.3	41.5	K
8.0	36.8	44.1	K	9.5	9 14.5	5.8		9.1	28.9	42.2	K	9.3	27.6	51.3		9.5	41 22.1	40.7	
9.4	2 13.0	51.5		9.4	49.3	26.1		9.5	20 5.2	59.5		8.8	29.7	23.6		9.5	32.7	37.7	
9.5	46.7	49.3		8.8	53.2	57.7	B	8.2	16.5	56.0	K	8.8	32.7	44.5	K	9.5	37.5	37.8	
9.5	56.9	34.0		8.5	10 20.2	16.9		7.9	34.2	25.3		9.5	34.2	4.6		9.4	48.8	48.4	
8.4	3 10.7	18.9	K	8.8	11 0.0	35.3		9.3	40.3	38.9		9.5	56.3	34.8		6.8	42 12.9	12.5	K
9.4	20.5	24.2		9.3	22.4	43.1		8.5	54.0	58.7	K	9.5	31 30.4	15.2		9.3	18.0	10.9	
9.0	28.1	59.0	A	9.5	30.0	22.8		9.1	21 23.6	11.9	K	9.4	47.0	5.4		9.1	22.7	4.6	K
9.5	51.0	25.3		8.9	56.4	7.9	K	9.5	26.2	43.4		9.3	50.3	39.3		9.4	22.7	12.8	
8.8	53.7	15.9		8.3	12 49.1	7.0	G	9.1	28.8	54.0		9.5	32 25.3	6.2		9.3	28.1	10.0	
9.2	4 6.8	9.9		9.5	51.2	54.1		8.8	22 5.6	11.7	K	9.5	35.2	7.9	B	9.3	43 17.5	30.3	
8.8	26.0	44.8		7.5	52.3	42.3	B	9.0	17.7	15.0	K	9.5	38.8	6.0		9.3	44 1.3	24.5	
9.4	5 1.0	39.6		9.5	13 18.0	52.6		9.5	35.8	50.1		8.7	46.9	3.2	K	9.2	5.2	12.6	
9.5	4.6	1.8		8.0	30.5	7.9	K	9.5	23 6.0	59.5		9.5	33 8.7	39.7		9.5	27.4	5.1	
9.4	5.7	37.5		8.8	31.7	26.6		9.0	54.3	16.3		9.5	25.6	56.3		8.2	32.1	20.9	G
9.5	10.4	14.7		9.0	59.4	4.2	K	9.5	57.0	16.8		8.0	28.7	0.6	K	8.6	37.3	39.2	
9.4	17.5	42.2		9.4	14 41.9	50.5		9.3	24 4.5	42.4		9.5	34 12.0	47.6		9.5	45 0.5	58.1	
9.3	18.0	22.8		9.3	43.0	31.6		9.5	25.0	13.8		9.5	13.3	55.9		9.2	9.9	12.3	K
9.4	22.0	17.1		8.5	49.0	53.2	B	9.4	31.8	16.3		9.4	31.8	20.2		9.3	23.3	55.8	
9.2	32.0	39.0	K	8.7	51.2	7.4	B	8.8	34.6	5.9	K	9.5	45.9	25.5		9.4	23.5	27.0	
9.5	35.8	2.8		9.5	15 6.0	35.5		9.4	43.7	50.0		9.5	58.7	56.4		9.5	46 8.5	39.7	
9.5	37.1	43.1		9.2	6.7	43.8		9.1	47.6	5.8	K	9.5	35 13.5	5.4		9.4	9.0	0.2	
9.5	46.7	56.7		9.5	37.2	32.8		9.4	25 15.0	54.2		9.5	36 15.8	3.8		9.5	13.8	35.1	
9.5	55.0	53.2		9.5	40.0	22.4		8.3	42.5	20.1	K	9.4	41.3	30.0		8.9	47 3.9	11.5	K
9.5	59.3	59.9		9.3	59.3	5.6		9.5	51.7	55.7		9.5	46.4	5.4		7.5	18.2	17.7	K
9.3	6 2.4	22.5		7.7	16 0.9	16.2	K	8.8	26 2.4	22.0	K	9.0	37 32.8	49.0		8.5	45.8	53.0	G
9.5	4.1	41.8		9.4	7.8	33.7		9.4	24.1	56.7	B	9.5	43.5	47.5		9.2	53.7	51.5	
9.4	26.5	8.4		9.3	10.7	14.0		8.9	29.7	16.3	K	9.5	46.5	24.6		9.1	48 16.9	25.6	K
9.5	27.5	3.3		9.1	16.0	33.1	K	9.5	41.7	11.6		9.2	38 5.7	14.2		9.5	17.8	53.9	
8.9	31.4	17.5		8.9	19.7	56.5	B	9.5	27 9.3	20.6		6.8	10.9	3.2	K	9.3	41.3	55.5	K

201—260				261—320				321—380				381—440				441—500			
	0h—1h		+44°		1h		+44°		1h		+44°		1h—2h		+44°		2h		+44°
m	′ ″		′	m	′ ″		′	m	′ ″		′	m	′ ″		′	m	′ ″		′
9.5	48 48.7		15.5	6.5	4 10.2		32.5	G	9.5	23 12.3		24.2	8.5	42 59.6	33.2	K	9.2	2 6.1	17.2
8.5	51.5		48.5	A	9.4	5 12.5		42.5		9.2	24 10.8		52.1	K	9.4	43 4.5	59.8		9.5	19.3	5.1
9.5	49 19.8		23.7		9.5	44.5		4.4		9.3	35.2		45.6		9.1	20.8	10.0		9.5	4 16.1	26.8
9.5	36.0		58.8		9.5	6 3.0		9.9		9.5	25 15.3		13.8		7.5	41.0	4.6	K	9.0	56.5	0.7	K
9.2	50.5		32.4		9.3	15.0		58.8		9.5	49.4		32.0		9.4	44.9	23.0		9.1	57.8	28.5	
7.5	50 4.8		48.1	A	9.5	16.3		54.4		8.5	57.0		50.5	L	9.5	45 4.7	56.1		8.6	5 34.4	54.7	K
9.5	22.7		22.0		9.5	42.5		59.9		9.2	26 30.5		35.7		9.0	46 7.6	34.8	K	9.1	6 8.3	53.4	
8.1	31.7		9.9	K	9.5	58.1		54.1		8.5	39.5		13.2	K	9.5	38.6	44.1		9.4	57.0	56.0	
9.5	41.9		1.4		9.1	7 7.8		39.7		8.4	41.0		9.7	K	8.7	47 13.7	4.7	K	9.4	7 8.1	51.7	B
9.5	45.4		7.9		9.4	8 12.3		13.2		8.8	59.7		6.0	K	9.5	48 43.7	4.0		9.1	27.0	41.5	
9.4	51 2.3		51.6		6.4	40.2		8.6	K	9.5	27 12.0		15.7		9.0	52.2	54.6		9.1	47.7	13.7	
9.5	36.2		35.6	B	8.7	47.4		49.5		9.5	13.2		54.5		8.3	58.2	52.6		9.3	49.4	47.2	
9.0	52 21.0		27.5		9.5	50.0		58.9		9.5	58.7		11.9		8.3	49 8.3	46.6		9.5	8 13.3	58.8	
9.5	44.8		17.6		9.5	51.4		3.5		9.5	28 0.0		49.4		9.1	9.8	43.8		9.1	16.8	51.9	
7.2	53 3.7		39.7	K	9.4	9 3.2		6.0	B	9.0	29 24.0		3.3		9.5	17.1	54.2		9.4	35.2	59.2	
9.2	14.5		0.2		9.5	10.7		59.7		9.2	30.5		58.8		9.1	35.1	5.8	K	8.3	57.2	31.8	K
9.5	48.8		48.5		9.4	50.8		57.0		8.7	38.8		54.6		8.0	36.2	23.4	K	9.5	9 11.4	4.1	
9.5	54.9		52.0		8.0	10 21.8		53.4	L	8.8	41.9		8.6		8.0	46.0	42.3	K	8.7	28.8	57.6	A
9.3	54 16.7		22.9	K	7.5	34.6		56.1	L	9.2	42.7		10.2		8.2	50 18.3	0.8	K	9.5	38.6	14.0	
9.3	26.3		42.6		9.5	11 24.3		52.4		9.4	49.0		8.0		9.5	32.0	33.2		9.5	53.4	37.5	
8.6	31.5		39.0	K	9.5	33.9		28.5		7.0	49.7		39.7	K	9.5	51 29.1	43.0		9.5	10 42.3	28.1	
9.3	40.6		53.0		9.1	46.8		20.2	K	9.2	30 3.3		25.5		9.5	54.2	41.2		9.5	11 7.1	20.2	
9.5	55 30.0		3.7		9.4	52.3		29.2		9.3	36.8		14.7		9.5	52 11.3	31.0		9.5	11.5	20.7	
9.4	42.1		4.3		9.1	12 34.5		5.5	K	9.2	41.7		21.8		9.5	23.6	36.0		9.2	11.6	57.0	A
9.4	47.1		9.3		9.2	13 10.3		27.4	K	9.4	31 24.0		22.0		9.5	27.0	32.0		9.5	35.4	2.3	
8.8	51.5		21.3		9.4	44.8		21.3		9.3	32 3.9		1.8	K	8.4	59.7	34.5	K	9.5	40.8	23.2	
9.3	56 14.4		10.8		5.2	48.3		45.4	A	8.5	7.8		16.4	K	9.3	53 5.5	47.6	K	9.5	49.9	17.8	
9.5	46.8		22.8		9.3	14 8.3		31.9	B	9.5	21.1		5.4		9.3	20.5	2.3	K	9.5	12 21.4	21.3	
8.8	57 7.7		45.4		9.5	16.7		19.9		9.4	44.1		39.9		9.5	24.8	34.5		9.0	38.7	26.4	
9.0	12.3		41.1		7.5	47.1		34.5	B	8.6	59.8		18.8	K	9.3	30.1	20.7		9.5	58.6	48.9	
9.5	41.5		20.5		9.4	15 6.7		53.0	K	8.7	33 6.6		29.1	K	9.4	39.6	23.0		9.5	13 9.8	29.6	
8.3	45.4		0.3	K	9.3	26.5		37.1	B	9.0	7.5		50.7	K	9.5	54 10.0	46.3		9.4	26.5	45.7	
9.4	58 25.3		46.9		9.1	43.7		31.3	B	9.4	34 12.0		14.7		9.2	19.4	6.6		8.8	29.6	50.4	K
9.2	35.2		51.6	K	9.5	59.4		14.9		6.8	29.6		34.1	G	9.3	35.5	2.5		9.5	39.4	46.2	
9.5	43.4		30.0		9.5	16 14.3		55.6		9.5	31.9		53.9		9.1	55 5.1	40.0	K	9.5	52.0	36.9	
9.5	52.5		12.3		8.5	33.7		51.1	B	9.5	35.2		58.5		9.1	56 1.1	2.7		9.1	14 6.8	1.9	
9.4	54.1		0.2		9.2	35.8		35.4		8.5	57.4		40.6	G	9.3	12.2	53.5		9.2	9.1	6.6	
9.5	59 6.4		49.1		9.4	47.7		13.7	B	9.4	36 29.1		40.6		9.0	15.6	23.8	B	9.5	48.6	36.1	
9.5	24.7		6.8		8.7	50.9		50.7	K	9.5	41.6		11.9		9.1	56.7	3.0	L	9.5	49.3	48.8	
7.6	51.5		1.6	L	9.0	17 2.8		21.6		8.5	42.6		4.9	L	9.5	57 14.6	56.5	B	9.5	56.6	11.9	
9.5	52.0		50.1		9.5	9.8		28.5		9.5	37 6.5		6.0		9.5	26.1	59.5		9.3	15 21.0	37.5	
9.5	52.3		34.2		7.7	9.9		1.1	L	9.3	6.6		51.0	A	9.5	57.7	29.5		9.2	43.7	4.3	
9.5	58.0		43.7		9.0	33.8		26.5	B	9.0	6.8		58.8	A	9.5	58 2.5	25.7		7.6	45.9	59.1	A
9.0	58.4		2.5	B	8.3	18 17.6		55.9	K	9.0	9.9		55.8	A	9.4	2.8	13.1		9.4	47.1	56.1	
9.5	0 1.0		50.1		9.4	26.7		56.0		9.2	21.8		40.6		8.4	5.5	4.1	B	9.4	16 21.4	38.3	
9.5	21.5		51.3		9.0	41.2		19.9	K	9.1	46.5		57.8	A	9.5	44.8	28.1		9.5	41.3	16.3	
7.5	34.1		25.8	L	5.0	58.8		39.0	K	8.8	54.4		59.0	A	9.5	59 11.1	52.1		9.5	45.7	5.2	
9.5	42.5		41.9		9.4	19 25.6		29.1	B	9.4	38 23.9		1.1		9.4	12.3	42.4		9.5	51.3	28.0	
9.5	44.6		26.6		9.5	43.9		25.2		9.0	37.5		1.0	K	9.5	16.5	25.4		9.1	17 4.9	26.5	L
9.0	1 2.9		7.3	K	8.5	50.5		9.7		9.3	49.8		33.3		9.2	46.7	15.7		9.5	16.8	16.2	
9.0	33.7		39.4		8.5	20 2.0		22.4	L	9.5	39 24.7		8.8		9.5	46.9	58.8		9.1	17.4	42.2	
8.5	36.4		58.5	K	8.3	6.6		51.9	K	9.1	32.7		4.5	K	9.5	59.0	53.4		9.5	19.6	23.3	
8.7	58.5		52.1	K	9.3	40.4		10.1		9.5	48.1		33.3	B	9.5	0 18.7	6.4		9.1	30.8	18.5	L
9.0	2 47.7		18.6	L	8.8	41.1		27.7	B	8.6	40 15.9		19.6	K	9.5	42.7	16.4		9.5	32.7	35.8	
9.5	3 11.0		57.3		8.8	46.8		6.2		9.5	16.8		33.9		9.5	1 8.4	6.1		9.1	35.1	54.7	
9.2	12.5		31.0		9.5	50.4		21.8		9.5	32.8		51.9		9.5	11.5	52.7		9.4	38.8	45.5	
8.0	24.7		22.7	L	8.9	52.0		34.9		8.0	41 0.6		31.5	K	9.2	42.9	47.4		9.5	55.5	0.4	
9.4	33.0		26.5		9.3	21 22.5		0.3		9.4	42 12.7		41.6		9.2	53.4	5.4		9.4	18 13.8	48.8	
9.0	57.4		48.9		8.0	59.2		10.8	K	8.5	44.5		16.1	K	9.5	59.0	53.9		8.7	34.1	5.9	K
9.4	4 2.0		25.7		9.1	22 18.3		36.3	A	9.5	55.1		24.1		9.3	59.5	33.3		8.3	36.3	43.1	K

501—560				561—620				621—680				681—740				741—800			
	2ᵘ	+44°			2ᵘ	+44°			2ᵘ—3ᵘ	+44°			3ᵘ	+44°			3ᵘ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	18 36.3	13.2		9.5	32 32.4	5.0		9.5	56 44.1	14.5		9.0	12 34.5	8.0	K	9.1	24 42.1	5.4	K
9.1	19 18.6	53.5		9.5	52.1	49.5		9.4	44.8	20.5		9.5	13 1.6	56.4		7.3	45.4	18.0	K
8.8	26.5	16.0	L	9.5	57.3	51.7		9.5	57 27.7	5.1		8.2	5.2	26.8	K	9.5	47.5	39.4	
9.0	30.1	57.5	K	9.2	33 22.0	18.7		9.4	58 6.5	9.8		9.4	9.2	21.2		8.1	25 2.8	57.5	L
9.5	34.2	54.1		9.2	22.5	21.7	B	9.5	14.9	52.2		9.5	11.1	13.2		9.0	18.6	56.4	
8.4	45.2	52.9	K	9.0	49.1	39.3	K	9.5	27.0	6.6		9.5	19.4	13.9		9.3	47.1	37.7	
9.5	54.4	10.2		9.5	34 57.6	25.5		8.9	46.3	41.8	B	9.4	20.0	46.0		8.4	26 23.4	49.6	A
9.5	56.6	48.3		9.4	35 2.3	53.5		9.5	58.6	50.3		9.5	25.5	4.6		9.5	33.0	49.9	
9.5	57.6	23.1		8.0	15.3	58.4	K	9.2	59 13.2	3.2		9.5	46.9	9.5		9.5	46.4	42.5	
9.4	20 33.5	0.4		8.8	15.3	16.9	K	8.5	37.6	49.1	A	9.5	50.4	31.5		9.5	51.0	4.6	
9.5	51.4	12.7		9.5	43.2	22.1		4.5	44.6	17.9	K	9.5	56.8	24.2		8.5	27 33.0	34.1	A
7.5	21 4.3	46.6		9.3	36 23.1	5.7		9.5	55.1	58.6		9.5	14 49.9	39.8		9.4	42.6	0.6	
9.3	8.7	57.5		8.1	48.0	50.2	B	9.5	0 3.3	26.8		9.4	15 33.5	57.6		9.5	44.4	47.2	
9.4	13.1	53.0		9.2	58.6	58.6		7.5	1 28.6	27.9	K	9.5	38.1	3.7		9.5	55.1	12.5	
8.0	21.1	24.0	K	9.3	37 12.6	18.3	B	9.2	37.5	13.5		7.6	42.0	59.9	B	9.3	28 19.5	59.0	B
9.5	22.8	51.4		9.0	50.3	39.1		8.9	2 38.8	47.1	K	9.4	48.6	43.0		9.1	19.6	57.6	A
9.1	26.2	1.7	B	8.9	38 2.1	39.6		9.0	3 17.6	4.8	K	9.5	16 5.3	56.9		8.0	19.9	18.8	K
9.3	22 0.0	41.1		9.1	39 30.2	30.0		9.4	23.8	4.7		9.0	7.2	58.9	A	9.2	22.8	38.7	
9.5	14.4	23.7		8.8	32.6	43.4		9.5	32.4	52.2		9.1	8.4	44.6	A	8.0	23.0	18.6	K
8.7	42.0	5.7	K	8.0	45.7	39.0	K	9.5	42.3	11.4		8.5	9.8	46.8	A	9.2	37.6	43.4	
9.4	43.4	17.8		9.5	52.7	17.3		9.1	46.0	44.2		9.5	24.9	44.4		8.2	42.2	3.1	L
9.5	23 26.7	7.2		8.7	40 6.9	48.6	K	9.4	4 4.8	5.0		9.5	44.5	51.2		9.5	29 1.4	15.9	
9.5	36.6	31.6		9.5	42.6	52.8	B	9.1	8.2	55.2		9.5	17 19.6	54.6		8.8	6.8	23.8	K
9.5	55.4	13.9		9.5	44.1	3.4		9.5	46.5	54.4		9.5	20.3	10.8		9.5	34.1	47.1	
9.5	24 2.1	43.2		9.5	49.4	34.1		9.5	5 16.8	53.5		9.5	33.1	20.8		9.1	53.6	54.8	K
9.0	10.7	37.8	A	9.5	41 0.4	58.2		9.2	27.1	18.4		9.5	58.7	54.7		9.2	59.5	52.0	K
9.5	54.4	44.6		9.5	14.7	52.1		9.4	6 11.7	21.5		9.5	18 8.5	20.4		9.4	30 0.4	20.0	
9.4	55.6	51.3		9.5	23.0	23.1		6.8	15.6	48.0	K	9.5	18.0	51.4		7.8	43.6	13.0	K
9.3	25 1.2	26.1		8.6	28.9	32.9	L	9.3	7 3.0	21.1		9.5	26.4	37.1		9.5	57.1	8.2	
9.2	4 0	56.1	A	9.5	52.7	52.8		9.5	34.1	29.1		9.5	43.2	12.8		8.0	58.5	27.0	B
9.4	10.4	10.7		7.8	42 10.6	27.2	K	9.5	53.2	51.1		9.5	48.2	21.0		9.5	58.5	10.4	
9.5	42.4	10.1		9.4	12.3	9.3		9.5	8 5.2	48.7		8.9	49.5	8.4	B	9.3	31 28.9	22.7	
9.5	26 8.4	36.3		6.8	20.1	17.4	K	9.3	12.3	0.3		9.4	19 5.4	33.4		8.2	31.2	8.2	K
7.4	13.5	0.2	K	9.4	37.9	52.4		9.2	18.8	51.5		7.3	18.8	32.2	K	9.4	36.7	0.8	
8.9	15.3	33.4	B	9.4	43 17.2	13.9		8.8	20.1	41.9	K	9.5	28.3	16.8		8.1	32 10.9	57.7	A
8.9	39.4	30.9	K	9.3	45 58.8	4.0		7.9	44.6	10.9	K	9.5	55.2	0.3		9.2	33 9.1	40.9	
9.1	44.4	11.3		9.1	46 23.7	5.7		9.4	46.0	1.4		8.5	20 40.1	19.7	K	9.2	13.2	38.7	
9.5	54.0	32.7		8.9	30.0	23.3	L	9.3	56.9	56.2		9.5	44.0	22.8		9.5	30.1	23.6	
9.3	27 30.5	7.6		9.5	52.6	57.2		9.4	57.2	31.8		9.5	21 2.9	25.3		8.8	54.0	2.1	K
9.5	38.7	16.0	B	8.8	47 14.1	31.7	L	9.4	9 2.5	7.2		9.5	20.5	52.5		9.5	58.6	40.0	
9.3	39.0	8.4		9.1	46.9	10.8		8.6	5.1	46.0	K	8.9	25.3	9.4		9.5	34 3.4	52.1	
9.5	52.8	51.7		9.4	53.4	6.1		9.3	5.8	34.6		9.5	38.9	24.7		7.5	3.4	25.0	K
9.1	28 0.4	49.0		9.1	48 2.6	32.0	B	9.5	19.7	9.4		9.5	42.4	31.4		9.4	18.3	55.2	
8.7	10.0	48.9		9.5	34.5	13.6		9.2	24.9	33.3		9.0	43.7	2.1	B	9.5	28.3	1.8	
9.5	20.1	23.1		9.5	49 38.6	27.1		9.4	27.5	46.6		9.4	52.9	28.1		9.5	36.6	6.9	
9.2	23.7	31.0		9.5	53.6	21.0		9.3	45.9	58.7		9.5	22 5.0	27.6		9.5	38.7	35.8	
9.5	56.0	33.4		9.5	58.2	55.9		9.5	10 6.7	2.9		9.5	5.2	8.3		9.5	59.8	50.1	
9.5	29 32.9	7.0		9.5	50 2.5	12.4		9.0	24.5	50.1	K	9.4	7.2	56.8		9.5	35 2.2	18.7	
9.5	33.6	51.6		9.0	36.6	33.7	K	9.0	29.9	42.9		9.0	8.5	28.1	B	9.4	14.1	16.4	
8.1	30 14.1	13.0	K	9.5	44.6	59.5		9.0	49.0	30.3		9.0	9.0	18.6		7.8	27.9	53.1	A
9.4	20.6	57.1		9.4	51 22.1	54.4		9.5	11 1.8	40.4		9.5	9.7	5.6		9.1	50.6	46.6	
8.2	30.5	14.4	K	8.8	29.5	17.4		9.5	7.1	9.8		7.5	21.1	20.3	K	9.5	36 19.2	5.2	
9.1	53.6	9.7		9.3	31.6	31.6		9.1	15.3	40.8	B	9.2	34.9	16.9		9.3	43.4	34.4	A
9.5	59.0	39.2		9.3	47.7	43.5		9.5	16.2	12.0		6.5	43.1	21.5	K	9.5	58.8	42.5	
9.2	31 1.3	57.4	K	9.5	52 53.0	42.5		9.5	24.1	51.1		9.5	59.0	46.5		8.5	37 16.6	20.0	K
9.2	2.7	0.8		9.5	53 28.2	55.0		9.5	31.2	26.6		9.5	23 21.5	39.8		9.4	56.1	9.6	
9.3	44.1	14.4		9.5	55 2.6	49.1		7.8	37.3	51.4	K	9.1	48.7	36.4		7.8	58.9	53.8	A
8.2	32 16.3	51.7	A	9.0	49.7	30.8	K	9.5	12 13.5	25.1		9.3	49.3	56.3		9.4	38 31.9	13.6	B
9.5	21.6	1.0		9.3	56 1.5	30.8		9.2	15.6	8.0		9.4	24 9.0	43.4		9.3	50.1	47.9	
7.8	26.5	23.1	K	9.5	41.8	59.2		9.5	23.1	30.6		9.0	19.4	50.1		9.5	59.3	15.3	

801—860				861—920				921—980				981—1040				1041—1100			
	3h	+44°			3h—4h	+44°			4h	+44°			4h	+44°			4h	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
5.8	40 0.8	30.3	K	9.2	57 41.6	43.1		9.5	10 47.8	12.8		9.0	23 52.3	7.5	K	9.5	42 7.0	23.0	
9.5	41 45.2	13.2		7.5	58 7.3	17.4	K	9.5	53.7	38.3		7.8	52.8	41.6	A	9.4	33.0	40.7	
9.4	42 7.3	31.0		9.1	25.4	52.5	K	9.5	11 25.7	28.9		9.5	55.0	45.3		9.5	43 30.7	32.9	
9.4	15.5	45.0		9.5	59 3.7	11.0		9.0	29.9	54.2	B	9.4	24 25.5	21.4		8.0	51.9	29.0	
9.3	23.6	36.9	B	9.5	55.2	2.5		9.5	32.4	1.5		9.5	31.7	3.2		9.5	44 4.6	6.8	
9.5	24.5	38.0		9.5	0 15.6	24.2		9.5	36.2	26.1		9.5	32.3	23.0		9.4	7.5	5.8	
9.5	59.8	22.8		9.5	36.0	1.6		9.5	12 21.0	54.1		9.4	36.5	20.9		8.9	8.3	6.9	B
9.5	43 36.4	52.1		9.5	48.5	49.9		9.5	41.8	33.1		9.5	40.8	37.7		9.3	22.1	20.8	
9.1	44 30.5	27.2		9.4	52.7	13.7		9.2	42.5	42.6		9.5	42.0	41.4		8.8	46.2	54.8	
9.5	43.8	16.3		9.4	1 5.0	58.7		9.4	58.8	20.0		8.8	25 5.4	45.1	A	9.0	45 21.9	17.1	B
9.5	51.0	40.4		9.5	40.4	4.8		9.5	13 5.0	20.4		7.0	20.5	54.6	A	9.3	24.3	0.9	
9.5	45 30.7	5.6		9.4	41.5	17.8		8.8	11.8	43.8	A	9.4	29.4	31.2		7.5	25.8	47.6	L
9.0	33.1	21.7	K	8.8	49.2	29.8	K	9.3	57.1	54.1		9.1	54.0	31.5		9.3	26.7	17.1	B
9.4	49.6	47.5		9.4	55.7	36.4		8.5	14 19.8	46.7	K	8.6	26 4.9	40.2	A	9.5	45.2	41.0	
9.3	57.2	3.2		9.5	2 14.4	4.4		9.5	20.3	32.3		7.7	53.5	30.1	K	9.5	46.7	30.2	
7.8	46 13.0	29.9	K	9.5	20.9	57.0		9.5	20.5	43.5		9.0	27 12.8	17.9		9.3	53.3	2.4	
9.3	29.4	10.2		9.5	44.8	14.3		9.5	23.4	33.5		8.0	25.7	23.5		9.2	54.1	7.3	
8.8	37.7	25.1	L	9.5	3 11.5	10.0		9.5	23.5	38.1		8.9	38.9	9.5	K	9.1	55.1	13.9	B
9.2	47 44.8	38.0		9.5	15.8	1.3		9.5	46.8	0.3		9.2	45.5	15.0		9.4	46 20.5	28.5	
9.5	58.5	56.4		9.4	53.7	12.4		9.5	48.3	13.2		9.3	28 46.1	18.2		8.7	28.7	25.0	K
9.5	48 26.0	23.0		7.7	57.9	22.6	K	9.5	48.4	52.3		9.5	29 1.0	12.7		9.5	45.6	13.0	
9.0	42.1	43.5		9.5	4 17.3	5.0		7.8	53.3	1.2	K	9.5	1.5	34.1		9.5	47 28.3	54.2	
9.4	55.9	10.6		8.8	24.8	50.0	K	9.5	15 20.8	17.5		8.8	26.4	40.0		9.5	34.3	52.2	
9.0	49 2.9	14.0		9.4	27.0	33.2		9.5	33.2	34.9		9.5	46.8	34.5		9.5	45.4	47.3	
9.4	16.9	33.5		9.3	30.5	33.8	B	9.2	38.5	54.6		9.5	30 48.7	23.8		8.7	48 2.0	12.8	
7.7	18.3	3.7	K	8.8	31.0	59.6	A	9.1	39.6	53.7	B	8.0	31 11.5	12.7	K	9.5	11.8	14.4	
8.7	43.4	28.8		9.3	31.6	21.5		8.0	57.8	24.9	K	8.2	19.8	32.7	K	9.3	15.0	47.3	
8.9	43.8	19.8	B	9.5	52.3	54.7		9.4	16 14.3	4.4		9.5	32 12.7	33.7		8.6	18.2	0.6	
9.2	52.3	7.6	B	8.9	54.2	24.6	B	9.3	18.8	23.6		9.5	33 1.6	2.1		9.3	26.3	2.2	
9.5	50 6.4	22.3		7.5	59.0	23.9	L	9.5	35.7	36.0		9.5	29.4	15.2		9.5	29.5	37.3	B
9.5	24.7	10.2		9.1	5 0.0	19.7	L	9.5	44.9	10.6		9.5	32.6	42.6		9.5	41.6	1.5	
9.4	29.4	0.6		9.5	23.8	54.6		9.5	17 1.1	37.0		8.6	38.7	57.7	K	9.5	45.0	37.2	
9.5	33.5	4.3		8.0	30.1	18.8	L	9.5	11.8	46.1		6.9	34 10.2	29.2	L	9.5	49 23.0	21.9	
8.6	51.6	0.6	L	9.4	36.6	17.0		9.5	33.9	15.6		9.0	11.0	5.2		7.5	44.8	38.5	A
9.3	51 23.7	19.5		9.4	6 9.0	55.5		9.4	36.8	30.3		9.0	35 10.4	5.9		9.3	50 37.0	5.0	
8.7	38.0	8.0	L	9.3	28.1	53.1		9.4	38.8	24.9		8.6	24.4	49.3	A	8.5	44.2	7.2	
9.4	53.0	7.9		9.4	47.0	40.2		8.3	52.4	42.8		9.5	36 9.0	26.4		7.5	51 1.1	10.7	B
8.9	55.2	19.7	L	9.3	51.7	42.8	B	8.2	54.0	24.4	K	9.2	16.3	54.7	A	9.3	39.4	49.7	
9.4	52 18.7	54.0		9.5	52.2	8.2		9.5	18 34.8	6.0		9.5	43.7	3.9		8.3	41.3	48.4	B
9.5	33.1	30.5		9.5	54.3	33.9		9.1	19 6.2	18.7		9.5	47.0	8.5		8.8	54.2	3.1	
9.5	36.9	7.0		7.8	8 2.9	19.4	K	9.5	45.7	58.2		9.2	37 14.8	54.9	A	9.1	56.7	27.5	
9.2	53 7.2	33.0		9.4	7.4	48.0		9.5	20 18.1	37.9		9.5	15.4	21.2		8.9	52 19.4	37.6	
9.5	37.8	19.7	B	9.5	19.3	35.5		9.4	29.0	25.0		9.5	30.7	51.0	A	9.4	37.0	4.2	
9.5	42.0	54.7		9.5	19.8	18.7		6.7	33.8	16.7	K	9.5	51.0	55.6		9.5	53 4.7	30.0	B
9.5	54 8.0	40.4		9.4	23.5	3.7		9.4	47.2	57.3		9.1	51.2	14.4		9.5	54.1	33.0	
9.5	28.6	13.5		9.0	39.4	58.2		9.5	21 14.3	52.7		9.2	38 25.8	38.5	B	8.7	54 12.2	44.8	
9.5	55 7.7	46.2		9.5	44.0	46.1		9.0	15.9	36.8		9.2	27.3	51.9		9.4	28.3	38.7	
9.5	15.5	33.1		9.5	52.2	6.5		9.0	22 7.5	4.5		9.5	32.8	3.1		7.8	53.0	51.1	K
9.5	33.6	0.0		9.5	55.9	3.8		9.0	8.0	12.8		9.3	33.3	32.1		9.5	55 0.2	12.7	
9.3	56 17.4	57.0		9.4	56.5	10.6		8.2	8.9	18.3	L	9.5	46.0	8.1		9.5	38.6	16.0	
9.5	18.5	26.8		9.4	9 29.2	9.7		7.0	11.3	34.9	A	9.5	53.5	18.0		7.3	56 6.8	31.6	L
9.5	20.3	3.0		9.5	31.9	30.5		9.5	13.2	56.6		9.5	39 19.4	51.1		9.1	25.7	2.8	K
9.0	20.7	34.7		9.5	45.0	9.6		7.0	41.5	36.6	A	9.5	35.1	20.7		9.5	27.4	50.1	
9.2	35.1	16.2		9.5	46.3	52.0		8.7	48.7	47.9	A	8.6	46.0	32.4		9.5	48.6	58.9	
9.2	38.9	30.3		9.5	50.6	43.2		9.5	58.3	57.3		9.3	50.0	0.5		9.5	49.6	59.7	
8.9	42.0	15.7	K	9.5	10 1.5	35.9		9.5	23 15.2	24.5		8.0	40 37.2	42.5	S	9.4	57 8.0	25.1	
9.2	53.5	14.8		8.9	17.0	41.8	K	9.1	19.9	4.8	B	9.3	54.9	19.5	K	9.2	28.9	6.5	
9.5	57 19.8	44.3		9.2	35.2	47.5		9.5	20.8	8.5		9.4	41 17.6	1.1		9.4	40.1	2.2	
9.1	28.2	26.3		8.8	39.8	31.8		8.8	21.8	24.2	B	9.5	23.4	2.2		9.0	45.2	3.9	K
9.4	35.2	54.6		8.6	45.1	32.1		9.0	37.2	7.7	K	9.2	45.3	42.8	K	9.3	51.9	34.3	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	4h—5h	+44°			5h	+44°			5h	+44°			5h	+44°			5h—6h	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	57 53.0	1.3		8.9	8 12.7	25.1		9.2	20 45.0	18.3	K	8.2	35 57.9	1.4	L	9.5	51 49.2	6.4	
9.5	58 2.8	56.5	B	9.1	14.0	28.8		9.2	21 7.0	36.4	K	9.5	37 6.6	59.7		9.5	52 1.0	28.0	
9.4	3.4	29.8		9.5	28.2	53.5		9.1	20.9	20.0	K	9.5	20.0	32.5		9.1	8.3	58.7	
8.9	30.1	26.0	K	8.9	31.0	3.6		9.5	22.8	40.0		9.5	23.1	17.7		9.5	14.5	14.3	
9.0	33.2	17.3		8.5	35.5	50.8	L	9.5	36.6	51.8		9.5	46.2	54.4		9.5	29.4	46.9	
9.5	41.8	59.2		9.5	36.9	40.5		9.0	49.7	9.6		9.4	54.7	57.2		8.5	42.6	1.0	K
9.4	46.6	20.5		8.5	39.4	29.8	K	7.6	22 1.5	16.2	L	9.3	57.9	45.0		8.7	49.3	40.0	
9.1	49.8	13.8	K	9.5	45.1	40.6		9.5	17.9	29.5		9.2	58.1	47.0	B	9.5	53 16.1	1.9	
9.5	59 3.5	9.8		9.4	9 8.2	10.1		9.5	28.6	24.1		9.5	38 13.9	8.9		9.5	20.8	38.4	
9.4	12.0	18.4		7.0	30.9	16.4	G	9.5	53.2	27.1		9.5	29.6	37.5		9.3	27.6	59.4	
9.5	28.0	23.0		8.7	34.3	29.0	K	9.5	23 7.9	11.2		9.0	53.6	13.5		9.2	37.5	16.8	K
9.5	59.8	52.7		9.5	42.8	18.6		7.8	14.1	40.9	S	9.3	39 5.7	37.0		9.0	43.8	41.6	K
9.4	0 14.5	14.3		9.4	10 3.0	41.7	B	9.0	17.7	8.5	B	9.5	20.6	48.4		7.4	54.7	15.9	K
9.5	16.5	14.9		9.4	3.9	43.2		9.3	41.1	19.2		9.4	50.4	8.9		9.2	54 11.7	5.8	
9.4	17.8	58.1		9.5	6.4	16.7		9.2	44.5	46.9		9.2	55.9	38.5		9.5	26.8	39.6	
9.3	27.7	10.6	B	9.5	36.5	50.4		9.5	24 10.8	52.8		8.5	40 19.2	54.1	A	9.4	30.3	49.5	
8.0	57.2	32.6	K	9.5	11 9.6	11.3		8.9	19.6	39.4	K	8.9	41 28.6	50.3	A	9.5	58.3	8.9	
9.3	1 0.4	51.8		9.5	10.3	42.7		9.5	39.0	54.8		8.9	29.5	6.9	K	9.5	55 10.7	11.9	
8.8	5.5	36.2	K	9.5	17.4	18.3		8.5	46.8	49.8	A	9.3	36.1	41.3		8.0	12.5	42.0	A
9.5	21.5	48.2		9.4	22.8	25.1		9.3	48.7	5.4		9.0	38.2	55.2		9.0	20.3	34.4	
9.4	21.9	9.0		9.5	30.1	1.9		9.5	48.9	3.4		9.0	41.0	46.5	B	9.5	22.8	41.8	
9.5	30.0	56.0		7.4	35.8	55.8	A	9.5	58.7	9.2		9.5	42 13.9	30.5		9.0	58.1	57.7	A
9.5	52.2	7.0		9.5	43.5	2.3		9.5	25 13.6	9.4	B	7.9	14.8	20.6	K	9.5	56 4.6	44.7	
9.5	2 1.0	23.1		8.8	50.6	23.7	K	9.4	25.7	6.9		9.4	28.7	13.2		9.5	11.7	43.9	
9.5	1.5	21.3	B	9.5	53.0	32.4		9.3	32.1	52.2		9.5	54.9	31.5		9.5	20.5	12.1	
7.5	7.2	14.8	L	9.4	12 1.5	8.0		8.0	38.6	39.0	K	8.3	56.3	14.8	L	9.0	26.4	9.9	
9.4	17.1	47.4		9.5	5.2	30.4		7.2	38.9	12.8	L	9.5	44 0.8	38.5		9.1	28.2	6.8	
7.0	36.8	22.9	L	9.4	11.0	6.8		8.8	44.7	23.1		8.5	8.0	28.6	K	9.5	32.1	48.5	
9.0	41.1	15.2		9.4	59.7	33.1		9.5	26 7.3	44.4		9.4	23.5	5.5		9.5	50.0	42.1	
8.9	41.3	17.5		9.5	13 46.8	40.5		9.0	48.4	29.4	B	9.4	32.6	57.4	A	9.4	57.9	33.0	
9.4	55.6	49.1		9.3	14 37.1	36.2		8.7	48.6	45.9		8.9	33.9	55.4	A	9.5	57 22.1	59.2	
9.3	57.2	57.2	B	9.0	49.6	5.9		7.1	54.5	29.6	B	9.3	45 3.1	18.6		9.5	58 16.4	20.5	
9.4	3 1.5	38.3		9.0	56.5	52.6	B	8.8	27 28.6	29.1	K	9.5	15.6	49.8		9.5	45.2	44.4	
9.2	16.8	25.1		9.4	59.3	53.5		8.9	33.3	36.5	K	8.5	20.9	33.0	K	8.5	50.8	40.4	B
9.2	19.9	29.9		8.2	15 0.6	15.4	K	9.3	36.4	40.6	B	9.1	30.8	11.7		9.5	59 31.2	2.9	
9.2	23.7	31.8		9.3	25.1	32.0		9.5	42.1	40.0		9.1	31.1	15.2		9.4	34.0	6.8	
9.1	38.0	12.8	K	9.4	47.2	4.6		9.5	56.2	36.0		9.2	46 14.0	36.2		9.2	34.4	40.0	
9.2	4 3.9	48.7		9.3	59.3	40.7		9.2	28 11.6	28.6		9.1	26.3	55.9		9.5	40.5	22.1	
9.0	9.0	36.7		9.5	16 39.1	19.8		9.2	24.9	46.9		9.3	37.1	39.4		9.1	0 28.7	31.9	
9.4	23.6	18.0	K	9.1	46.5	41.2		9.5	29 31.4	59.8		9.5	47.8	18.3		9.1	31.4	45.6	
9.2	25.4	18.3	K	9.1	47.9	57.5		9.0	47.1	15.8	B	9.3	51.9	39.4		7.5	34.6	58.5	A
9.5	28.7	22.3		9.5	57.2	7.4		9.5	30 5.1	43.4		9.5	47 24.4	55.5		9.1	35.9	25.7	
8.5	43.5	31.1		7.8	17 16.1	2.3	K	9.5	31 2.4	8.1		9.5	53.1	48.0		7.3	56.8	9.5	L
9.5	51.9	39.6		9.3	20.0	33.1		9.5	8.9	5.1	B	9.5	58.3	19.8		9.5	1 18.0	33.3	
8.8	52.6	1.6		9.2	21.0	25.0		9.5	34.5	56.8		9.5	58.5	33.4		9.5	23.6	43.0	
8.0	5 2.4	10.2		7.8	22.5	47.0	A	9.3	57.7	40.6	B	9.5	48 33.8	44.1		9.5	25.2	49.4	
9.5	10.9	58.7		9.5	41.1	55.4		8.4	32 3.5	4.3	K	9.1	35.4	1.1		9.5	26.0	12.2	
9.5	21.5	41.6		9.2	18 0.3	26.3	K	8.4	3.9	33.0	K	2.0	54.3	56.0	K	8.4	33.1	8.1	L
9.5	28.4	43.6		9.5	0.5	20.5		9.5	13.8	20.1		7.7	49 2.5	5.8		9.5	51.4	30.6	
9.5	38.2	8.0		9.4	3.5	18.7		7.3	25.3	45.9	A	8.7	8.4	18.0		9.4	2 1.5	36.7	
9.5	43.9	30.2		9.4	13.5	9.0		9.5	33 11.0	9.8		8.1	26.4	58.3	K	9.5	7.4	51.8	
9.2	45.5	37.0	K	9.5	42.7	13.5		9.5	13.8	43.2		7.0	43.1	34.6	K	8.1	28.5	31.8	
9.5	47.8	17.4		9.3	43.1	40.6		9.5	44.5	27.6		8.6	49.3	45.4		8.0	29.3	32.9	
9.5	6 5.2	50.7		9.5	19 11.6	41.3		8.8	52.1	20.6		8.8	50 0.2	55.0		8.9	31.4	14.6	
9.5	18.8	3.1		8.8	15.0	41.0	A	8.5	34 8.3	45.9		9.5	45.0	52.1		9.4	40.2	55.3	
9.0	41.2	51.8		9.5	22.8	11.6		9.0	34.7	38.5	K	9.1	57.5	56.1		7.5	3 12.5	47.0	A
9.2	7 9.5	33.9	K	8.8	20 5.1	36.9		8.8	35 28.9	7.9		9.3	51 3.7	47.8		8.8	14.1	36.2	
8.6	29.7	39.4	K	9.4	10.2	24.9	B	7.3	36.3	42.9	K	8.7	12.4	17.9		9.5	45.3	10.6	
9.3	41.0	33.3	K	9.5	28.9	10.8		9.5	46.7	31.5		9.5	24.8	15.7		7.7	4 3.9	37.4	K
9.5	57.4	4.9		9.5	40.1	58.1		8.6	51.6	15.7		8.8	44.3	9.9		9.5	17.6	9.4	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	6ʰ	+44°			6ʰ	+44°			6ʰ	+44°			6ʰ—7ʰ	+44°			7ʰ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	4 23.0	11.8		9.2	19 39.0	14.8		8.9	33 7.9	38.6		9.2	56 16.4	33.8	K	8.2	23 20.9	47.7	K
9.1	33.1	12.0		9.5	50.3	39.1		8.4	19.6	6.0		9.2	41.3	39.6	K	9.1	33.0	15.3	
9.4	5 0.4	18.0		8.0	57.6	1.5	K	9.5	41.8	27.1		9.4	46.9	55.1		9.2	44.6	5.3	
9.1	8.2	42.4		8.5	20 23.5	23.5	K	9.1	56.4	42.2		7.0	57 39.8	15.1	K	9.5	24 24.0	52.1	
9.5	24.3	7.4		9.5	27.4	47.9		7.0	34 12.9	38.6	K	9.3	42.5	23.5		9.4	25 49.5	35.3	
9.5	45.9	40.0		9.5	43.8	57.6		9.2	16.5	21.2		9.1	58 13.8	37.4	K	9.1	26 26.7	57.8	A
9.5	56.8	33.8		9.3	50.4	30.0		9.5	41.9	35.4		7.5	37.3	28.9	K	9.3	36.9	10.1	B
8.5	6 15.7	45.8	K	9.5	21 7.9	48.8		7.8	53.8	23.0	K	9.5	48.9	26.4		7.5	27 7.7	55.8	A
9.4	30.3	37.4		9.5	27.0	45.4		9.2	35 12.9	27.4	K	9.5	59 10.2	53.1		9.4	20.1	36.3	
8.5	59.6	54.8	K	9.4	34.4	6.3		8.7	15.8	20.6	K	9.3	19.6	42.2		8.5	28 0.3	30.3	B
9.2	7 38.4	59.2		9.2	43.1	54.0		9.1	18.2	57.4		9.5	22.1	25.9		9.2	1.5	13.5	
9.5	8 1.0	49.5		9.2	46.8	19.6		9.1	36 2.0	9.3		9.0	24.0	2.7		9.3	44.8	46.8	
9.5	5.0	29.5		8.9	48.9	18.7		8.5	7.8	30.4	K	9.0	25.8	33.5	K	8.5	45.0	13.6	
9.5	19.7	44.7		8.4	52.6	30.2	G	9.5	38.3	50.2		9.1	0 28.8	14.2		9.2	54.7	53.8	
8.7	39.5	39.6		8.7	22 1.1	42.4	A	9.3	37 33.2	43.2	A	9.4	31.1	11.3		9.5	29 34.2	53.2	
9.5	9 2.1	39.1		8.5	2.7	18.9	K	9.5	38 7.5	2.7		9.5	43.9	41.4		9.5	40.3	8.6	
9.5	6.0	36.7		9.4	7.8	26.4		9.5	40.9	42.2		9.2	1 34.3	15.2		9.4	31 0.4	10.6	
9.2	6.6	41.9		9.4	16.7	14.8		9.2	39 3.9	11.6	K	6.7	36.9	4.4	K	8.8	19.1	28.8	K
9.5	24.2	38.8		9.5	20.1	3.0		9.3	25.3	40.3	K	7.8	2 4.3	14.6	K	9.2	53.4	33.4	K
8.6	10 7.3	47.7		9.2	34.9	32.7	A	9.2	43.2	3.7		9.5	46.7	32.0		8.8	32 16.5	41.9	K
9.1	9.2	37.0		9.4	50.0	8.8		9.5	50.9	42.6		9.5	46.9	2.9		9.1	33 10.0	55.3	
9.5	11 5.1	31.6		9.2	23 16.4	29.3		9.5	40 5.1	57.1		8.9	3 57.8	32.5	K	8.8	10.2	50.3	K
9.5	14.7	3.3		9.3	24 12.3	6.6		9.0	26.3	24.9		9.4	4 19.4	0.3		8.5	11.3	13.4	B
9.5	16.8	28.0		9.3	29.1	51.4		8.0	41.3	13.1	G	9.4	5 2.0	42.4	B	9.4	25.2	11.6	
9.5	23.0	9.1		9.2	45.9	45.5		9.4	41 4.5	0.5		9.4	5.3	21.0		9.5	30.3	21.4	
6.7	29.0	7.6	K	9.5	58.2	30.8		9.3	7.9	4.2		9.5	12.0	44.4		7.0	33.2	7.6	G
9.3	34.6	29.2	B	9.4	25 4.6	0.6		8.8	43 19.9	41.8	A	9.5	6 14.0	49.8		8.8	34 57.0	55.3	
9.4	41.5	36.6		9.0	7.2	28.8		9.5	55.2	12.3		9.5	7 12.2	16.5		9.0	35 9.2	26.6	
7.3	44.3	28.4	K	9.4	19.0	0.7		9.5	44 13.0	18.6		9.5	16.8	28.9		9.5	9.5	57.2	
9.4	47.6	6.9		8.8	36.9	50.5	A	9.3	31.8	14.6		8.8	27.2	50.2	A	8.4	27.0	38.3	K
8.4	50.4	33.5	L	9.2	26 5.4	28.0		6.5	45.7	4.7	G	9.5	8 9.9	13.6		9.5	36 2.2	42.8	
9.5	12 2.4	49.8		9.3	8.2	10.7		8.1	45 0.8	32.9		9.5	9 50.8	34.4		9.3	5.1	1.0	B
9.5	40.8	41.5		9.1	11.8	21.1	K	9.4	19.5	50.2		9.5	10 18.3	2.8		9.4	37 29.4	28.4	
9.1	13 32.6	59.6		8.6	16.4	49.6	A	8.4	49.5	49.9		9.5	25.7	41.3		8.7	31.8	37.7	
9.5	40.4	0.9		9.5	44.6	24.0		9.2	46 0.0	23.9		9.4	57.9	51.5		9.5	56.1	57.8	
9.5	14 2.7	42.0		8.9	52.5	22.9	K	8.3	21.1	51.2	B	9.5	11 0.6	23.5		9.2	38 50.7	32.3	K
9.4	5.8	22.0		9.5	27 5.0	9.0		9.5	32.3	8.3		9.5	12 12.2	48.6		9.4	39 4.2	36.3	
9.4	19.7	15.3		9.1	5.0	3.6		9.1	47 2.5	37.9	K	9.5	39.8	5.1		9.4	19.7	40.4	
9.5	23.1	32.6		9.5	16.7	44.9		9.3	43.8	39.4		9.4	48.8	19.1	B	7.8	25.2	44.3	A
9.5	38.3	55.4		8.7	46.8	11.5		9.0	44.6	36.4	K	9.2	13 2.8	36.4	K	8.5	55.3	0.3	K
9.0	45.4	55.0		7.8	53.2	25.7	K	9.2	48 33.9	59.4	K	9.5	14.4	25.5		9.5	42 7.3	21.8	
7.7	15 33.7	48.4	L	9.5	28 12.6	32.7		8.5	49 6.8	43.2	A	9.0	14 11.2	10.0		9.5	8.4	2.8	
8.6	36.8	28.1	K	8.6	44.9	36.6		9.2	11.3	42.2	A	9.1	48.3	41.9		9.1	11.5	43.2	K
9.5	59.1	13.1		9.3	54.0	47.1		9.5	50 6.0	21.0		9.5	53.9	38.9		9.3	28.2	12.4	
8.6	16 7.6	53.3	L	9.5	29 21.1	34.3		9.5	32.5	51.1		9.5	15 13.8	59.1		9.5	43 21.9	50.7	
9.5	34.7	6.1		6.8	26.6	8.1	K	9.5	36.6	56.1		9.5	34.3	21.1		9.4	44 5.4	30.8	
9.2	46.8	57.0		9.2	27.0	26.5		8.3	51 9.6	4.3	B	7.5	16 20.9	45.3	G	9.0	34.9	23.3	G
9.5	56.9	57.0		8.5	30.2	59.1		9.2	11.5	12.3		9.2	43.2	54.2	K	8.0	43.4	22.3	G
9.4	17 17.3	26.4		7.0	41.0	27.1	K	7.7	30.9	38.9	B	9.5	48.5	7.7		9.5	45 38.8	27.1	
9.5	25.0	21.0		9.4	44.3	46.5		9.5	33.9	7.3		9.5	17 53.2	10.9		8.8	46 10.6	33.3	K
9.5	28.2	37.8		9.2	30 54.8	18.9		9.5	55.3	25.0		8.8	18 26.3	16.1	B	9.5	45.0	37.8	
9.5	37.6	56.5		9.4	31 4.7	17.8		8.5	52 35.4	39.0	B	9.2	52.9	45.0	K	9.3	47 59.0	27.3	
9.2	50.4	15.0		9.0	13.8	9.0		8.8	41.9	57.8	K	9.5	19 51.8	5.3		6.5	48 5.9	22.5	G
9.4	18 13.6	11.8		9.5	40.2	19.0		9.3	45.3	35.0		9.5	20 17.0	59.9		9.4	11.1	5.1	
9.5	27.5	4.4		9.5	46.1	55.4		9.3	53 19.8	22.0		9.5	32.3	34.9		9.3	30.2	4.0	B
8.3	32.8	58.5	K	8.6	32 23.8	46.8	K	9.5	54 27.5	50.9		9.2	21 13.2	52.8		9.4	36.0	10.4	
9.2	19 17.2	48.5		8.8	30.0	58.2	A	9.2	55 35.0	50.2	A	9.5	16.0	8.7		9.4	37.1	9.5	
9.3	22.9	2.4		5.5	31.3	39.4	A	9.3	44.8	47.8		9.3	22.0	36.5	K	9.0	49 44.6	42.9	
9.3	34.5	55.6		8.8	33 1.5	51.5	A	9.5	54.3	0.6		9.4	37.7	55.5	B	9.1	49.0	1.9	
9.2	37.3	46.4		8.4	3.7	32.8	K	9.5	56 4.4	47.2		9.5	22 0.7	57.2		9.5	51 13.7	45.2	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	7ʰ—8ʰ	+44°			8ʰ—9ʰ	+44°			8ʰ—9ʰ	+44°			9ʰ	+44°			9ʰ—10ʰ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.5	52 7.6	23.7	K	9.5	26 20.3	5.9		8.7	55 46.7	38.6		9.4	26 30.0	31.0		8.7	51 26.8	41.6	
9.4	14.1	35.4		9.4	27 8.4	51.2		8.8	56 5.0	29.6	K	9.5	48.8	33.0		9.3	52 12.9	21.6	
9.5	15.5	16.9		8.8	42.7	18.3	K	9.5	12.5	37.5		9.5	50.6	19.6		9.4	49.3	9.6	B
9.5	38.2	5.4		9.4	43.6	31.3		9.3	13.2	52.4		9.4	28 16.2	32.6	K	9.4	54 11.5	25.0	
8.9	59.3	30.9	B	9.0	46.9	56.7	K	9.4	57 4.2	42.4	B	9.3	19.5	21.0		9.0	27.9	17.1	K
8.0	53 40.9	37.1	B	9.5	28 6.5	9.4		9.1	24.0	57.3	K	8.5	36.7	50.9	K	9.3	55 15.4	27.0	
7.3	50.9	14.8	K	9.0	22.9	37.3		9.5	58 8.8	11.0		9.1	29 33.3	32.9		9.3	47.3	7.7	
9.0	53.9	15.4	K	8.8	29 6.3	50.7	A	9.3	29.7	26.6		9.4	41.5	16.6		9.5	56 27.9	31.1	
9.0	54 7.2	26.7		7.5	24.8	44.3	A	9.3	59 1.5	24.5		9.0	30 40.0	31.0	K	9.1	37.0	59.5	
9.4	10.7	21.8		7.5	34.9	46.8	A	9.5	7.8	12.0	B	9.5	40.4	9.9	B	9.5	40.3	41.3	
9.0	51.9	51.2	K	9.5	30 2.5	19.8		9.0	9.0	50.4		9.5	31 34.2	28.5		9.0	57 15.2	16.6	K
9.3	55 12.4	55.1	B	9.5	52.9	57.1		8.7	25.0	37.0	K	7.5	39.7	38.5	K	9.0	32.4	15.6	K
9.5	18.2	15.0		9.5	53.0	29.8		9.3	39.3	57.8		9.5	53.0	7.1		9.5	58 39.0	0.7	
9.1	57 1.9	44.2	K	9.0	31 1.9	1.5	K	9.4	0 7.0	58.8		8.5	32 18.0	51.4	A	9.4	59 5.9	22.1	
9.3	37.3	2.1	B	9.3	12.5	37.0		9.5	50.7	2.5	B	7.2	35.5	17.6	K	9.6	0 0.4	56.4	A
8.3	58 46.7	27.3	K	9.3	16.9	22.5	B	8.4	55.0	47.4	A	9.5	33 35.5	45.9		8.8	58.3	3.6	K
9.5	59 20.7	49.4		9.3	32 40.5	24.1		9.4	1 0.1	31.9		9.3	35.5	29.3		9.2	1 22.4	50.5	
8.8	26.0	53.4	B	8.7	53.3	36.4	A	9.5	12.6	57.4		9.1	44.6	30.0	K	8.5	3 8.9	15.6	K
9.5	46.0	11.3		9.5	33 46.0	42.0		9.3	14.5	24.0		9.5	35 9.3	42.4		9.5	27.2	23.6	
9.5	46.7	51.4		8.7	34 2.8	33.5	A	9.5	2 11.2	38.5		9.3	36 59.6	8.6		8.8	5 6.8	17.1	B
9.5	0 10.8	18.6		8.4	3.5	0.9	K	9.4	23.0	6.6	K	9.5	37 18.3	17.0		9.4	8.1	22.0	B
9.5	2 21.0	17.8		9.1	30.0	53.0		9.0	43.3	23.0	K	9.1	33.3	43.4		9.2	27.9	27.0	
9.4	3 3.1	45.4		8.4	35 12.8	42.3	R	8.0	3 48.5	54.1	A	9.5	42.6	18.0		9.5	38.9	38.1	
9.5	4 5.8	35.4		7.5	24.4	11.3	K	9.4	57.0	19.6		8.9	38 9.0	54.4	A	9.0	6 18.5	45.0	
9.1	27.1	39.3	B	8.0	36 0.9	10.6	K	8.6	4 11.1	24.7	K	9.5	38.0	59.8		9.5	29.1	33.0	
8.6	5 3.0	49.7	A	9.5	1.1	44.2	B	8.5	5 3.3	2.6		9.3	39 20.5	24.1	B	9.0	56.2	56.5	
9.5	22.5	44.2		9.0	37 37.6	1.4	B	8.7	35.3	38.9		7.3	26.5	12.1	K	8.2	7 18.2	47.5	K
8.5	53.0	43.1	A	9.5	38 17.3	48.0		9.0	6 13.8	50.9		7.0	34.9	20.2	B	9.3	8 1.5	4.1	
9.5	6 5.3	46.7		9.3	39 34.0	33.5		9.1	23.2	44.9		8.5	54.8	51.2	A	9.4	9 17.9	11.5	B
9.4	40.5	26.8		9.2	40 7.4	12.7		8.5	35.0	10.2	K	9.5	40 17.3	57.8		9.5	27.5	38.3	
9.5	54.4	51.2		9.4	41 1.5	8.8		9.2	52.7	43.4		9.5	24.5	15.0		9.5	32.9	6.1	
9.5	9 18.2	33.8		8.3	1.5	2.4	G	9.5	7 13.1	37.9		9.0	58.0	13.6	K	7.7	35.4	29.4	K
8.7	32.8	36.0	K	9.0	55.6	32.1		9.5	9 45.3	26.0		7.8	41 8.5	39.7	K	6.5	10 1.9	46.0	A
9.2	10 18.0	22.3		5.5	42 12.6	16.6	K	9.2	10 0.7	6.6	K	9.4	42 15.0	0.7		9.4	6.8	26.5	
9.1	29.2	24.7	K	8.9	34.3	53.3	K	9.3	38.0	11.5		8.8	50.8	28.7		8.8	10.4	45.0	A
9.5	39.4	18.3		9.5	43.5	38.3		9.3	12 43.3	6.6		8.8	43 5.7	49.4	K	9.4	12 55.9	19.6	
9.0	11 5.8	51.7	A	9.5	43 22.0	4.9		8.6	13 9.4	12.1	K	9.5	19.8	28.0		7.3	13 14.1	38.6	K
9.5	18.0	13.8		7.8	45 2.7	8.5	K	9.5	37.1	20.4		7.8	22.7	9.1	L	9.4	27.6	39.5	
9.1	13 7.5	20.8	K	9.3	4.5	46.9		9.1	44.1	17.9	B	9.2	25.2	24.0		8.9	14 18.4	58.2	K
8.2	14 59.5	0.5	B	9.4	16.0	42.4		9.4	14 27.0	56.9		8.3	37.3	43.3	K	9.4	15 6.8	56.0	B
8.7	15 22.1	25.3	K	8.8	46.0	44.4	A	7.8	15 50.7	38.5	A	8.8	44 26.5	2.6		9.5	10.5	29.8	B
9.1	23.9	4.2		9.5	46 13.4	10.0		9.3	16 16.3	35.0		9.2	40.0	9.6	K	9.5	37.0	56.1	
9.3	31.9	51.7		9.0	21.5	53.9	A	9.0	17 10.8	47.4	A	9.4	54.8	49.0		9.3	38.6	45.8	K
9.1	16 31.2	25.8		8.5	24.2	12.8	L	9.1	41.7	13.4	B	8.6	45 19.6	55.4		9.4	53.2	32.4	B
9.1	44.8	6.9		8.6	31.9	41.3	B	9.4	18 3.7	2.6	B	8.5	27.3	28.0	K	8.2	16 33.9	50.8	A
8.5	17 5.2	20.3	K	8.5	45.0	48.4	K	9.2	6.5	24.0	K	9.3	43.8	7.7		8.7	18 6.9	19.9	
8.8	22.1	37.0	K	7.0	47 21.5	58.8	A	9.5	21.6	30.5		9.5	46 10.7	40.5		9.4	19 6.9	0.8	
9.5	18 15.4	1.0		9.3	48 47.2	26.5		9.5	19 34.5	23.6		9.1	35.3	37.2		9.5	18.4	15.5	
9.4	33.0	35.8		8.5	49 13.5	58.8	A	9.4	20 7.0	27.5		8.8	37.6	19.6		9.2	20 8.9	21.9	K
9.2	19 2.2	32.0		9.0	23.5	51.9	A	9.5	33.4	37.0		9.5	51.5	58.8		9.1	30.1	45.3	
9.3	49.3	38.9	B	9.5	26.3	9.8		9.4	21 15.3	54.8		8.2	47 29.5	39.6	K	9.2	21 1.9	6.0	
9.3	57.5	29.2		9.4	50 33.9	11.8		9.4	58.5	48.9		9.4	48 57.3	38.5		9.5	22 5.0	59.2	
9.5	22 34.1	28.3		8.5	51 55.6	14.6	A	7.3	22 54.5	23.3	K	9.4	49 3.6	37.8		9.1	41.4	20.9	
8.8	50.0	6.4	K	9.2	53 2.0	3.1	K	8.2	23 6.0	51.9	A	9.0	11.9	26.5		8.0	56.9	0.8	K
9.2	23 9.5	50.7		8.7	54 20.3	15.6		8.9	22.5	5.1		9.5	29.9	59.9		7.0	23 49.9	56.8	A
9.3	24 10.5	33.3		9.5	21.0	52.4		9.5	52.3	23.3		9.5	31.3	29.1		9.4	24 21.7	50.2	B
9.5	25 14.0	18.6		8.0	50.3	0.8	B	9.5	24 59.0	5.6		9.4	41.4	6.9		9.5	39.0	47.2	
9.4	56.8	25.8		9.3	55.7	55.7	B	9.5	25 25.7	1.8	B	8.0	55.4	8.6	K	8.9	25 30.4	12.9	K
9.5	26 1.9	12.3		9.5	56.5	12.6		9.5	30.5	26.0		9.3	58.3	7.0	B	9.5	26 52.9	43.2	
9.5	12.2	33.8		8.1	55 14.6	2.0	G	8.3	49.0	18.1	K	9.1	50 35.7	58.0	K	9.5	27 16.4	15.0	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	10ᵘ—11ᵘ	+44°			11ᵘ	+44°			11ᵘ—12ᵘ	+44°			12ᵘ	+44°			12ᵘ—13ᵘ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	28 3.4	7.5	K	9.2	1 31.2	9.9		7.8	37 38.1	1.7	K	9.5	13 16.8	8.7		9.2	51 59.4	35.3	
9.4	18.8	24.9		9.0	2 8.9	17.3	K	9.2	45.7	7.2	K	8.0	21.0	13.2	K	9.4	52 37.0	23.7	
9.5	29 12.4	38.4		8.6	15.9	42.0	K	9.5	38 17.4	27.3		9.2	57.1	30.5		9.5	42.2	40.5	
9.0	21.4	52.3	K	9.5	57.2	57.4		9.5	31.1	44.8		9.3	14 3.7	51.3		9.4	42.9	2.4	
9.3	26.9	53.8		9.5	3 8.0	21.6		9.5	39 30.0	24.6		9.0	15.0	47.3		8.4	53 43.7	56.4	K
9.5	54.0	3.0		9.2	6 1.5	38.8		8.5	35.2	15.6		9.5	31.6	7.8		8.6	55 14.9	30.6	K
9.5	30 20.1	36.6		9.2	30.8	38.0	K	9.5	40 35.4	15.2		9.4	35.3	1.3		8.5	26.1	13.8	
9.3	31 41.4	48.3		7.5	40.2	8.9	K	9.5	41 49.6	41.8		9.4	49.7	12.3		9.3	57 22.0	51.0	
9.5	32 45.4	26.5		9.4	7 3.5	39.0		9.5	42 20.3	36.8		9.5	15 14.0	42.8		9.4	29.5	22.3	
9.4	48.6	45.8		9.3	48.8	56.9	K	9.3	26.7	31.0	B	7.5	39.6	36.8	B	8.5	34.6	53.1	A
9.5	33 14.3	53.3	B	9.3	50.3	1.9		9.1	40.6	16.7		9.5	16 12.6	22.1		9.5	3 17.0	25.1	
7.8	38 4.1	51.9	L	9.0	51.0	48.4	K	8.0	43 0.4	28.5	K	9.5	18 57.6	31.0		9.4	4 11.5	30.6	
9.3	8.5	41.1		9.3	53.2	33.3		8.9	11.6	3.1	K	9.5	20 20.0	17.3		9.3	5 1.8	34.7	B
9.2	19.4	1.0	K	9.2	8 14.5	33.9		9.4	29.6	37.8		9.5	21 8.1	52.5		9.1	2.4	53.9	A
8.8	21.7	37.4		8.5	44.8	4.4		9.3	35.0	58.7		9.5	41.4	37.0		9.5	6 8.0	18.3	
9.5	40.4	26.9		9.5	9 19.0	13.4		8.9	39.8	54.7	A	9.0	23 50.9	59.3		9.5	7 44.1	41.1	
9.5	49.1	26.9		9.1	10 20.3	4.4		9.5	47.4	13.2		9.5	24 36.9	52.2	B	9.5	8 7.0	32.5	
9.5	58.8	33.9		9.5	32.7	37.5		9.4	44 18.9	23.5		9.0	39.5	0.9	K	9.1	40.0	48.7	B
9.2	40 0.3	5.0	K	9.4	43.8	10.4		9.0	45 13.0	24.8		9.0	57.0	16.9		9.5	9 8.1	40.7	
7.8	31.3	42.5	A	9.3	11 21.5	33.2		9.4	17.8	23.6		9.5	57.8	28.7		9.4	39.4	59.0	B
9.5	46.9	57.3		8.2	12 31.5	11.4	K	9.5	34.0	24.8		9.5	58.0	20.9		9.0	42.7	51.0	
9.3	52.8	36.5	K	9.5	13 7.2	49.4		9.5	52.5	4.8		8.0	25 15.5	0.4	K	8.9	10 0.2	2.1	K
9.1	42 36.0	57.8		5.3	14 51.7	17.1	K	9.5	47 41.8	49.3		9.3	26 12.5	32.0		9.3	4.0	21.5	
8.4	44 49.1	45.4		8.3	17 7.2	0.8	K	8.8	49 45.6	9.7	R	9.3	14.8	8.9		8.2	14.6	36.4	B
8.6	49.3	30.2		9.5	44.0	13.2		8.0	52 32.2	9.2	K	7.2	41.4	53.0	A	6.5	14 32.4	44.9	A
9.0	45 37.3	0.9		9.5	58.6	57.2		8.6	53 6.4	25.5	K	9.1	27 0.3	56.5	A	9.0	46.8	24.4	
8.5	43.8	9.9	L	9.5	18 12.7	12.2		9.5	10.3	43.6	B	9.3	24.2	11.2		9.3	51.9	43.0	
8.3	46 15.4	21.5	K	9.5	19.5	0.8	B	9.4	24.2	20.1	B	9.5	28 31.5	30.2		9.0	15 7.9	54.0	A
9.5	47 9.3	20.3		9.3	47.5	47.1	A	8.3	29.1	35.4	K	9.5	32.9	13.7		6.4	44.7	40.4	A
9.1	49.9	12.3	B	9.3	54.8	40.7	A	9.5	56.5	19.2		9.5	29 13.7	42.0		9.2	16 48.1	47.9	A
9.5	52.0	22.0		8.8	19 44.1	57.7	K	9.0	56.5	22.8	K	9.5	31 27.5	19.2		9.0	17 35.7	21.5	K
8.3	49 0.9	42.8	A	9.3	50.1	52.7		8.9	55 13.4	7.4	B	8.4	28.4	54.4	K	9.5	18 43.8	56.9	
9.5	9.0	40.4		9.0	20 6.1	42.3	K	8.0	33.6	2.8	K	9.4	33 1.0	17.4		9.0	23 20.0	3.5	K
9.5	29.2	28.5		8.7	12.2	30.1	A	9.5	50.5	33.8		9.5	34 5.5	10.8		7.7	24 21.3	32.7	K
9.1	50 58.5	35.3	A	7.9	26.5	40.0	A	9.5	57 8.7	21.5		8.6	20.9	46.5	K	9.4	30.8	43.6	
8.2	51 1.2	39.1	A	7.5	36.5	44.1	A	8.7	16.8	9.7	K	8.9	54.4	44.5	K	9.5	25 39.5	59.8	
8.7	2.3	7.9		9.3	37.8	26.2		9.5	32.6	40.8		9.5	35 21.4	2.4		9.0	42.6	13.5	K
8.2	17.4	35.2	A	9.3	39.6	34.8		9.3	58 1.0	17.7		8.5	29.0	1.4	R	8.6	26 41.6	50.9	K
7.7	52 30.9	40.9	A	9.0	21 31.1	13.9		8.5	12.6	58.7	A	9.1	51.0	48.5	K	9.2	50.8	1.0	
9.5	53 9.2	44.4		9.2	34.4	35.3	A	8.3	18.1	52.2	A	8.9	36 43.8	37.9	K	9.5	27 5.3	30.4	
9.0	43.3	8.9		8.8	43.8	25.9		9.2	59 55.0	54.8		6.1	37 37.6	53.9	A	9.5	30.1	8.5	
9.5	43.8	53.8		6.7	22 39.3	22.5	G	7.8	0 59.8	42.8	A	8.8	38 3.5	57.8	A	9.5	39.3	33.4	
8.3	55.8	29.5		9.2	43.5	35.4		9.5	2 4.6	31.5	B	8.5	5.5	12.8		9.5	40.3	38.8	
8.3	54 1.7	15.7	B	9.5	26 17.1	48.3		9.5	8.4	38.0		9.0	21.1	0.9		9.3	44.2	2.0	
9.4	15.6	5.4		9.3	34.1	48.8	A	9.2	3 16.5	33.8	A	9.1	42 1.2	56.5		6.5	29 4.0	55.9	A
9.2	55 44.3	14.4	K	9.3	59.5	3.2		9.2	39.3	49.3		8.5	16.0	9.3		9.4	5.9	52.1	B
9.0	56 12.8	34.5	K	8.5	27 11.3	25.5	K	9.2	4 2.3	7.5		9.5	43 26.0	59.0		9.5	30 49.8	19.2	
9.2	46.0	26.7		9.5	29 4.4	29.5		8.8	3.8	31.8	A	9.5	56.3	16.8		9.1	31 17.0	19.2	K
9.3	57 26.8	19.4		9.0	42.6	43.8		8.6	7.7	22.0		9.5	44 48.5	57.9		8.9	39.5	7.0	
9.5	58 8.0	34.1		6.0	30 37.3	25.2	K	9.4	38.9	31.2		8.4	58.6	48.0	K	8.7	32 44.3	28.1	K
8.5	14.8	16.2	B	9.3	43.3	31.5		8.5	7 0.8	12.7	K	8.6	45 50.0	33.3	K	9.3	33 25.4	16.0	
7.5	34.3	53.8	A	9.1	46.2	52.8	K	9.0	38.5	45.3	A	9.0	46 22.5	2.8		9.0	35.6	47.9	
9.5	59 5.3	39.4	B	9.4	31 2.5	1.8		9.5	56.4	24.5		9.5	47 52.4	39.0		9.5	34 23.0	11.5	
9.5	18.4	37.4		9.4	32 12.3	35.4		9.5	8 7.8	2.3		6.5	49 57.3	21.0	K	8.8	35 8.7	48.9	A
9.5	26.4	15.3		7.5	33 36.4	48.8	A	9.1	25.7	43.3	A	9.4	50 20.7	48.0		9.5	48.3	18.0	
9.2	37.3	22.3		9.5	44.2	1.7		8.4	9 17.4	27.9	L	9.5	42.9	50.0		9.5	36 27.1	38.5	
8.8	53.9	57.8	K	8.5	34 29.5	56.8	B	7.8	10 13.8	49.3	L	9.5	43.0	43.2		9.0	36.5	26.1	K
9.5	0 50.9	11.8	B	7.8	49.7	35.4	A	9.0	11 16.1	36.3	K	7.5	48.4	35.9	K	9.5	49.4	52.4	
9.0	1 13.4	43.9		9.2	35 45.0	21.9		9.2	12 13.9	2.4		9.5	51 18.0	56.5		9.2	39 29.8	51.9	K
9.5	21.5	23.7		9.5	36 2.8	59.2		7.0	46.9	24.2	K	9.2	49.5	30.5	K	9.1	40 32.7	35.7	A

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	13ᵘ—14ᵘ	+44°			14ᵘ—15ᵘ	+44°			15ᵘ	+44°			15ᵘ—16ᵘ	+44°			16ᵘ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	42 6.6	2.5	K	9.5	25 17.1	33.9		9.5	1 8.4	44.6		9.5	26 50.8	41.0		7.5	0 44.2	7.5	K
9.3	54.6	48.4	K	9.5	34.8	32.3		9.4	16.3	7.0		9.2	29 15.4	31.2		9.5	1 11.7	36.3	
9.0	45 17.8	13.3	K	9.3	35.9	24.8		8.3	27.0	20.2	K	8.9	37.6	1.1		8.7	3 14.0	31.0	K
8.7	29.3	37.0	A	9.2	38.0	56.8	A	9.5	43.8	26.8		9.3	49.7	46.3	K	9.5	41.3	19.5	
9.5	46 25.5	54.9		6.8	47.2	1.0	K	9.2	2 47.0	39.1	K	7.5	55.1	33.8	K	9.5	4 6.0	28.8	
9.3	56.7	57.9		9.5	26 19.0	56.3		9.5	50.7	17.9		9.4	31 54.3	18.9		9.5	8.9	33.1	B
9.5	47 0.6	20.9		8.7	27 14.1	23.1		9.3	3 33.6	58.5	K	9.5	32 11.7	57.2		9.4	32.4	1.6	
8.0	0.9	0.1	K	8.7	54.6	58.2	B	9.5	41.2	16.8		9.5	20.2	31.9		8.7	5 28.3	27.0	K
8.8	49 20.0	15.5		9.2	57.0	59.5		9.4	52.3	4.5		9.0	25.1	52.2	K	7.0	41.8	11.0	K
8.8	50 3.1	40.4	K	9.0	29 54.7	49.3	K	9.0	4 4.5	4.5		9.3	48.9	24.2		8.8	50.7	18.4	K
9.0	44.0	39.7	K	9.4	59.0	34.8		9.5	30.2	4.0		9.5	33 14.1	49.9	B	8.0	6 21.6	40.9	L
6.8	51 1.0	59.3	K	9.5	30 21.4	34.0		8.7	5 17.7	29.5		9.1	18.1	50.9	K	9.1	30.4	38.5	
9.1	52 5.1	24.4		8.6	58.8	38.3		9.1	35.4	3.4	K	6.8	29.4	5.0	K	9.0	44.1	29.0	K
9.4	15.0	59.8		9.2	31 2.0	49.6		9.0	57.9	57.0		9.2	35.6	1.5	K	8.0	8 2.4	1.5	K
9.2	53 7.6	58.3	K	9.0	38.4	20.7	K	9.5	6 0.8	3.0		9.3	59.1	43.6	B	9.0	57.2	49.9	K
9.5	51.0	31.5		6.0	32 45.2	16.5	K	8.2	21.0	20.9	K	9.3	34 2.1	37.6		9.4	9 6.7	51.9	
8.3	54 58.1	30.1	K	8.7	33 26.4	33.0		9.4	34.7	29.9		9.5	10.9	0.6		9.5	21.8	12.4	
9.3	55 10.0	38.0		9.0	34 15.0	43.9		9.5	37.5	40.6		8.5	11.9	20.6	K	9.4	47.2	46.5	
7.3	56 16.5	15.5	K	9.0	20.4	21.7	K	7.3	7 9.3	32.5	K	7.7	54.5	47.0	A	8.1	11 7.5	54.9	K
8.0	38.5	41.4	K	9.1	33.2	14.9	K	9.0	42.8	48.6	K	9.5	35 17.7	41.0		9.5	27.7	22.4	
9.2	58 48.1	22.4		9.0	35 55.9	1.0		9.5	8 17.4	4.0		6.8	30.6	19.5	K	8.5	14 15.3	44.9	K
8.7	59 37.6	35.0	K	8.3	36 21.7	6.9	K	9.5	10 39.5	11.7		9.4	37 52.1	2.5		9.5	15 14.7	35.5	
9.4	0 53.5	57.4		9.5	42.6	32.8		9.2	11 55.4	14.2	K	8.3	56.7	6.0	K	8.8	52.0	25.0	L
9.0	1 33.6	8.9	K	9.5	37 35.5	51.2		8.3	12 19.1	20.1	K	9.5	38 52.6	4.0		8.7	16 3.4	35.9	B
5.3	2 7.1	32.4	K	8.7	40.5	36.7	B	9.4	39.5	4.2	B	9.4	40 10.7	13.0		9.2	6.5	30.4	
9.4	42.2	32.4		8.5	38 12.2	7.9	K	9.5	49.8	52.0		9.5	36.6	17.6		7.3	35.3	10.5	K
8.1	3 16.2	25.8	K	8.5	22.7	20.5	K	9.5	13 2.1	22.1		9.0	41 14.7	10.0		9.4	17 8.7	49.5	
9.0	24.0	29.4	K	9.5	58.4	59.9		9.2	38.0	34.0	K	9.1	43 46.8	30.0		7.8	37.4	51.0	A
9.4	45.7	2.0		9.5	39 40.5	4.0		8.5	14 10.7	0.8		9.3	44 19.3	37.3		9.5	41.3	12.5	
8.8	4 24.5	26.8	K	8.7	40 6.7	19.5	K	9.5	18.8	34.7		9.5	45 2.2	15.5		7.3	18 12.1	25.4	A
9.1	27.8	56.0	A	8.0	54.7	4.9	K	9.2	30.6	47.0		7.5	5.7	57.4	A	9.0	15.1	36.0	K
9.5	5 29.1	3.0		8.6	41 16.3	30.5	K	8.7	38.9	44.6	A	9.5	46 34.5	42.5		8.2	19 1.4	42.9	A
9.5	41.5	46.9		9.0	43 4.8	49.5	K	6.3	15 43.2	58.3	A	8.8	47 10.0	9.5	B	9.5	22 12.3	30.0	
9.5	6 2.3	39.0		9.5	14.2	6.0		9.5	16 7.0	50.3		9.5	16.2	58.9		9.0	23 26.6	32.0	
9.1	24.1	38.5		9.3	45 10.6	24.9		9.5	31.2	53.0		9.1	29.4	38.6	K	9.4	24 14.7	4.4	
7.8	31.6	52.3	B	9.3	13.5	2.0	K	8.9	33.1	7.5		8.3	29.8	46.9	K	9.1	39.1	26.5	B
8.7	44.5	36.8	K	8.6	56.7	16.4	K	8.4	57.4	47.3		9.4	50.7	7.5		9.3	39.9	24.5	
9.4	7 39.9	52.9		9.1	46 57.2	15.9	K	9.5	17 56.1	44.8		8.5	48 1.3	57.9	K	8.8	54.6	41.3	K
8.9	8 19.6	15.5	K	7.8	57.9	49.5	A	9.5	18 26.5	2.5		9.1	49 11.1	42.5	K	9.2	25 7.7	3.4	K
9.4	9 1.7	30.8		8.9	47 50.9	17.4		9.1	47.8	21.8	B	9.1	37.2	50.9	A	9.3	26.3	31.9	
9.3	10 10.8	0.5	K	9.5	50 10.5	29.3	B	9.1	51.1	20.6	K	9.5	51 0.8	5.5		9.2	26 2.3	38.2	B
8.0	11 28.1	13.9	K	9.1	26.4	30.3	K	9.5	19 4.4	39.8		9.2	4.2	39.4	K	9.4	21.6	55.8	A
9.3	12 15.5	53.4		9.1	51 21.8	26.5	K	7.5	54.1	52.7	A	9.4	52 33.6	46.8	B	9.4	43.6	42.4	
9.1	53.3	47.4	A	9.3	51.4	28.3		6.8	21 1.6	49.3	A	7.9	42.1	33.0	K	9.1	27 10.7	19.5	B
9.0	13 38.2	22.4	K	9.1	51.5	38.9	K	7.3	27.4	31.8	K	9.3	53 19.3	33.0		7.9	26.7	34.2	L
9.0	15 29.5	56.3		9.2	52 18.1	59.0	A	9.0	35.8	21.0	K	8.3	23.6	28.3	K	9.5	27.5	17.6	B
8.6	16 6.5	38.4	K	9.4	53 5.3	38.1		9.5	42.8	40.8		9.5	25.1	57.2		9.4	52.1	37.7	B
9.2	13.1	21.4	K	8.2	7.8	37.6	B	9.1	43.5	23.6	K	9.4	54 1.9	21.0		9.2	29 57.6	31.4	
8.7	23.2	45.4	K	9.4	14.1	39.1		9.5	22 19.9	23.9		9.3	41.9	59.8	B	9.5	30 10.0	31.4	
7.3	17 55.4	7.4	G	9.3	17.1	33.7		9.5	26.5	44.1		6.5	55 30.5	41.2	K	9.0	38.3	34.9	K
9.5	18 22.5	36.3		9.5	54 13.4	59.9		9.5	27.8	47.9		9.5	56 5.0	29.3		9.4	31 25.7	11.8	
9.3	29.4	10.5		9.0	38.0	20.5		9.5	54.0	50.0		9.0	15.4	1.6	K	8.8	32 46.3	11.9	
9.2	19 29.2	51.8	K	8.0	56 40.3	6.9	K	9.5	23 0.0	55.5		8.5	38.8	12.2	B	9.5	33 48.6	32.8	
9.5	21 17.3	12.4		9.2	57 27.9	50.5		9.5	15.6	53.8		9.3	42.7	55.9		9.1	34 14.2	19.3	
9.5	17.5	19.9		9.5	58 9.4	47.5		9.5	41.9	42.8		8.8	57 29.4	18.0	K	9.5	52.7	40.8	
9.0	22 4.7	36.3	K	9.0	34.5	14.4	K	9.4	24 25.6	35.5		9.5	59 51.3	31.5		9.0	35 1.6	6.7	K
9.0	23 43.8	18.4		9.0	59 54.3	22.5		9.5	28.8	30.2		9.2	54.3	47.7	B	9.5	8.2	18.3	
6.3	44.9	54.3	K	8.5	0 19.8	5.4	K	9.0	25 30.7	41.3	A	9.3	0 4.7	15.0		8.2	58.7	18.4	K
9.5	24 54.1	25.7		8.7	1 0.6	30.8		9.4	26 4.0	47.5		9.3	6.6	23.9		9.4	37 0.6	51.8	
8.9	57.5	0.0	K	9.3	3.7	27.1		9.5	12.0	44.7		8.2	25.9	0.6	B	9.4	12.0	45.2	B

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	16ᵘ—17ᵘ	+44°			17ᵘ	+44°			17ᵘ	+44°			17ᵘ—18ᵘ	+44°			18ᵘ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.2	37 52.2	16.4	K	9.5	4 4.2	31.2	B	8.3	25 49.5	37.5		9.1	47 16.7	50.1		8.3	6 44.7	44.3	K
9.5	58.6	51.3		9.5	24.9	34.7		9.1	55.9	5.6	K	9.1	21.7	41.1	B	9.3	7 5.8	56.3	
8.7	38 31.2	11.8	K	9.0	42.0	51.9	K	9.3	58.5	13.6	K	8.8	51.7	9.4	K	9.4	7.0	49.2	
9.5	39 2.4	13.1	B	9.3	5 5.7	3.0		9.0	26 0.0	36.2		9.5	56.5	21.5		9.4	7.3	42.7	
8.9	8.1	50.8		9.4	46.7	16.8		8.6	24.5	18.9	K	8.4	48 2.0	42.0	K	9.4	8.5	38.4	
8.3	21.5	29.9	A	9.5	6 30.5	7.9		9.5	27 15.1	0.8		9.5	4.2	23.0		8.8	8 9.9	54.8	
9.5	41.7	19.8		9.4	48.5	41.0		9.5	28 12.5	9.8		9.1	8.0	38.7	B	9.4	13.6	41.6	
9.5	40 23.8	2.0		9.0	55.6	2.0	K	9.3	49.5	29.6	B	8.8	52.7	12.6	K	9.3	18.3	35.6	
9.1	29.1	44.8	K	9.2	7 6.3	21.4	K	9.1	29 42.5	34.8		8.3	49 41.0	11.9	K	9.5	25.3	41.9	
8.2	42.3	23.0	K	8.5	19.2	8.4	K	9.5	30 1.0	41.1		8.3	50 54.4	10.3		9.3	27.7	42.6	B
9.1	41 30.1	47.3	K	9.0	57.0	46.2	B	9.2	3.6	3.8		8.0	51 0.1	1.8	K	9.5	31.0	38.6	
9.5	47.2	7.4		9.5	8 29.6	39.5		9.4	19.7	28.6		8.9	6.3	3.4	K	9.4	31.3	58.0	
9.5	42 12.5	12.3		9.5	32.3	56.5		9.5	25.8	23.2		9.5	52 8.2	17.2		9.5	9 8.7	12.9	
9.0	44 1.2	7.9		9.1	33.7	46.9		9.4	26.2	50.9		9.5	44.3	39.6		9.0	15.9	23.9	
9.2	30.1	43.8	K	9.4	10 47.8	46.4		8.9	27.4	58.1	A	8.5	53 10.2	30.0		9.5	10 9.3	24.9	
9.4	45 40.9	14.3	B	9.5	52.2	24.6		9.5	41.9	29.8		9.3	12.7	47.3		9.0	15.9	15.9	K
9.2	50.7	30.3	K	9.4	55.0	50.4		9.4	31 17.2	28.8		9.2	18.1	56.4		8.0	24.5	35.4	K
9.5	46 31.1	59.2		8.7	11 7.9	48.4	B	8.0	32 19.3	48.8	K	9.3	54 8.8	35.6		9.3	26.9	37.8	
7.7	48.5	24.6	K	9.5	23.5	19.3		8.1	55.7	29.2	L	9.5	11.7	43.2		9.0	11 7.8	41.9	
9.0	47 29.2	11.8	K	9.1	46.8	37.0		9.3	33 24.8	47.6		8.0	27.0	57.0	K	9.3	12.9	33.0	
9.4	36.1	23.3		8.0	59.0	54.4	A	9.4	31.3	0.4		9.4	55 7.0	10.6		9.0	15.4	13.0	
8.8	48 27.6	39.8		9.1	12 19.7	27.8	K	9.5	34 0.0	2.8		8.0	15.0	44.8		9.5	52.8	47.7	
8.2	34.0	37.5	L	9.5	49.3	3.9		9.5	3.3	52.9		8.8	41.0	23.1		8.8	58.3	19.6	K
9.3	37.1	17.0	B	8.3	57.3	38.3	K	9.2	40.4	17.6	K	8.3	58.9	28.4	R	9.3	12 3.9	5.6	
7.3	49 10.7	1.0	K	8.5	13 9.4	44.4	K	6.8	35 14.0	5.9	K	9.5	56 12.2	48.8		9.3	4.8	34.6	B
9.2	22.0	42.5		8.7	11.9	39.9	K	9.5	21.5	5.7		9.1	28.6	7.1		8.8	6.1	13.8	K
8.9	32.6	37.8	K	8.5	15.5	45.9	K	9.0	33.6	36.0	K	9.0	39.7	12.6		9.4	11.4	41.7	
8.5	50 28.7	53.9	K	8.9	14 19.3	24.3	B	9.0	40.5	9.6	K	9.5	57 9.7	38.7		9.5	50.7	17.7	
9.5	40.1	4.6		9.4	35.3	22.3		9.1	36 10.4	13.2		9.5	39.0	2.9		9.1	13 22.5	25.9	
9.3	51 32.0	58.4	K	8.7	38.2	16.9	S	9.2	37 4.7	42.0	K	9.5	41.8	38.0		9.2	28.5	14.4	B
9.5	33.7	7.4		9.5	15 2.0	41.5		9.5	16.8	8.2		9.0	59.3	44.2	B	9.4	40.9	37.4	
8.8	52 9.6	20.1		8.3	32.3	42.3	K	9.5	19.9	56.6		6.5	58 15.2	15.2	K	9.2	57.7	7.1	
9.2	53 26.6	28.5		9.5	47.0	59.9		8.2	47.1	49.2	K	9.5	46.2	41.8		9.5	14 39.3	24.1	
9.3	28.2	30.6		9.1	52.9	6.4		8.9	58.2	27.5		9.3	59 21.3	12.6		9.5	56.3	30.3	
8.8	32.5	33.3	B	6.5	16 9.7	21.3	L	8.3	38 23.9	59.6	A	9.5	28.6	23.7		8.5	15 0.3	1.3	K
8.2	54 5.7	12.8	K	9.2	32.5	24.4		9.2	35.2	6.6	B	9.2	29.7	12.9		9.2	3.9	53.0	
9.1	11.2	10.9	A	9.1	38.1	36.0		6.5	50.3	8.8	K	9.0	37.3	56.5	K	9.1	25.4	23.4	K
9.3	58.5	57.9	K	9.4	43.6	10.8		9.4	39 22.7	11.6		9.0	39.0	19.0	B	8.0	30.3	49.4	K
9.5	55 15.5	17.4		9.0	17 26.3	3.6	B	9.2	38.6	0.6	B	9.2	59.4	25.7		9.0	16 35.9	46.7	K
9.3	36.3	22.4		9.1	19 7.8	2.1		8.5	51.2	7.1	K	9.4	0 13.2	50.3		9.4	43.1	10.8	
9.4	50.8	32.3	B	9.4	9.3	45.7		8.5	40 21.1	44.3	K	9.5	1 12.0	41.8		8.5	55.1	0.7	K
9.2	56 49.1	40.0		9.5	35.1	18.2		8.8	31.2	29.2	K	9.0	21.9	23.1		8.0	17 31.8	35.4	K
9.5	57 35.9	33.6		8.5	20 17.1	25.8	L	8.9	49.3	48.6	A	9.5	51.8	28.9		8.8	52.5	59.7	
9.5	44.7	11.4		9.5	27.0	6.3		8.5	53.5	18.2		9.5	2 10.3	35.9		8.5	18 20.2	10.6	B
9.1	58 12.3	58.9	K	9.0	27.7	22.8		9.5	41 7.7	15.8		9.5	3 14.5	1.0		8.8	21.3	11.8	
7.8	21.5	50.9	K	9.5	42.3	45.3	B	9.5	33.5	41.8		9.5	25.0	3.0		9.3	52.3	34.5	
9.5	55.9	40.0		9.4	21 3.8	51.5		9.4	48.3	47.2		9.4	38.2	2.6		9.3	19 4.1	59.8	B
9.3	56.6	28.4		8.6	22 40.3	5.2	B	9.5	42 50.0	40.6		9.2	49.5	19.0		9.0	11.5	54.3	
9.4	59 17.7	28.8		9.3	43.2	38.3		9.2	50.2	24.0		6.9	4 6.3	5.6	K	9.3	19.0	59.5	B
9.1	57.8	57.0		9.5	56.0	26.0		8.9	43 34.1	24.5	B	9.4	19.2	13.2		9.4	42.7	29.7	
8.6	0 24.1	58.0	B	9.5	57.9	11.1	B	9.5	44.2	41.1		9.5	23.6	35.5		9.4	43.2	39.0	
6.5	40.0	0.7	B	9.5	23 46.5	17.9		7.2	45.7	8.7	K	9.3	30.9	7.5		9.5	57.1	53.7	
9.5	1 32.2	13.4		9.3	50.6	29.1	B	8.0	44 24.7	53.5	K	8.5	35.7	19.6		9.3	20 30.9	53.3	
9.4	2 8.1	58.3	B	9.4	54.5	46.1		9.0	56.2	44.5		9.5	56.5	6.7		9.5	33.6	25.3	
9.5	27.3	7.9		9.0	24 0.8	8.0		9.2	45 20.3	59.9		9.5	5 32.2	38.7		9.5	21 11.7	22.2	
9.3	46.6	35.9		9.0	1.4	3.5	B	9.5	46 4.7	44.7		9.3	37.1	56.2		9.2	43.8	15.5	
7.8	48.1	27.1	K	9.2	2.1	56.1	B	7.5	14.5	32.1	K	9.0	47.4	31.0	B	9.5	22 8.1	22.9	
9.5	3 30.0	39.0		9.1	32.5	22.0		9.3	22.9	34.8	B	9.5	6 5.9	8.9		9.2	9.2	17.9	B
7.8	39.3	22.1	K	9.5	25 17.4	47.8		9.4	39.2	28.7		7.0	35.1	34.2	K	9.3	11.9	21.2	
9.5	52.6	29.2		9.4	25.8	53.6		7.2	56.9	56.9	K	9.2	42.6	27.1		9.2	15.9	53.6	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	18ᵘ	+44°			18ᵘ	+44°			18ᵘ—19ᵘ	+44°			19ᵘ	+44°			19ᵘ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	22 50.4	5.1	K	8.6	36 24.3	50.2	B	9.5	52 7.6	44.6		9.5	8 57.8	42.8		9.4	23 6.9	6.2	
9.3	23 23.0	23.4		9.0	30.5	32.5		9.4	17.7	38.4		8.6	9 1.3	28.3		9.5	42.2	37.8	
9.5	40.2	13.7		7.5	43.5	7.6	G	9.1	36.9	54.2		8.9	10 20.0	50.2		8.9	43.7	21.2	K
8.0	45.4	34.6	K	9.5	44.0	18.4		9.5	45.6	21.5		9.2	22.9	39.8		9.4	24 0.7	53.2	
7.7	57.8	1.7	K	9.5	48.6	42.5		9.5	53 1.0	8.8		9.4	36.8	59.3		9.0	4.0	53.0	
7.2	24 2.9	10.4	K	9.5	37 46.7	7.9		7.8	41.4	48.2	L	7.6	37.2	55.1	K	8.2	4.8	22.3	K
9.4	10.4	1.3	B	9.5	47.4	36.3		9.3	53.6	11.0		9.5	11 8.2	23.5		9.4	5.2	58.0	
8.0	11.8	38.2	K	8.4	53.8	1.6	K	9.5	59.0	16.8		9.0	10.9	10.0		9.4	18.1	22.5	
7.8	53.6	49.2	K	9.1	58.9	50.1		9.0	54 27.6	5.9		9.2	31.0	15.2		9.3	40.3	20.5	
9.5	55.4	11.0		9.4	59.8	56.3		9.5	53.9	4.2		9.4	50.7	49.7		9.5	25 4.0	9.0	
8.2	25 3.7	1.8		8.0	38 7.3	7.4	K	9.4	55 1.0	51.7		9.4	12 17.6	12.5		9.5	8.4	50.4	
9.1	51.3	51.8	K	9.0	23.4	17.5		9.2	11.9	55.9	K	8.6	21.2	30.6	K	9.5	11.7	3.8	
8.8	26 23.6	23.0		6.8	40.4	47.1	A	9.4	36.1	46.9	B	8.6	29.2	30.9	K	9.5	12.9	40.7	
8.8	24.0	33.0		9.0	40.4	47.4	A	9.5	56 0.0	53.5		9.5	13 9.2	40.6	B	7.7	28.1	23.6	K
9.0	26.1	13.0		9.0	39 2.5	9.7		9.2	3.8	47.2		9.5	16.7	10.5		9.1	39.2	49.7	
8.5	51.9	38.1		8.8	18.7	13.9		9.5	29.0	41.4		9.5	24.6	8.2	B	9.4	51.6	24.4	
9.1	27 3.1	30.2		8.5	29.0	16.2	K	9.5	30.5	36.1		9.5	26.9	9.0	B	8.2	56.5	2.5	B
9.4	11.5	17.5		9.0	35.9	1.2		9.5	33.3	51.5		9.2	32.3	11.4	B	9.3	26 1.5	4.0	
7.6	17.4	53.8	L	9.5	38.2	58.3		9.2	33.6	23.6		9.4	49.5	4.6		9.3	7.4	39.2	B
9.4	22.0	21.0		9.5	46.0	17.8		9.2	48.4	12.1		9.5	57.2	0.6		9.5	23.9	55.8	
9.5	24.7	58.1		9.5	48.3	52.5		9.5	56.2	57.1		9.5	14 7.0	8.2		9.5	24.2	30.3	
9.4	58.4	36.1		9.3	56.0	18.4		7.2	58.1	10.3	K	8.2	33.4	17.3	L	9.5	48.5	6.7	
8.9	28 11.9	13.2		7.8	40 4.7	44.4	A	9.5	57 0.6	42.4		9.5	40.0	56.7		9.2	53.7	38.8	
9.5	32.9	14.3		8.8	25.8	2.9		9.5	5.5	22.9		9.4	44.1	30.5		9.1	27 2.6	24.0	
9.2	29 29.7	0.1		8.3	31.7	48.4	A	9.3	11.8	45.3		9.2	15 0.9	53.8		9.5	27.8	51.9	
9.1	32.3	7.8	B	7.8	38.0	12.6	B	9.5	28.4	48.2		9.4	3.8	57.7		9.5	28.5	58.4	
9.5	34.8	36.8		9.0	50.5	54.3		9.3	49.5	53.1		8.1	16.5	6.0	S	9.5	41.7	0.1	
9.1	38.9	25.7		9.3	41 40.0	37.1		9.5	58 21.5	1.6		8.9	28.7	58.7		9.4	47.8	32.2	
8.6	43.9	26.7	K	9.0	42 23.3	32.2		9.1	32.6	43.3		6.7	31.6	45.8	A	8.7	49.2	59.8	K
9.1	30 10.5	22.8		9.4	43 4.7	38.2		9.0	33.1	45.0	K	9.3	16 49.5	16.2		7.8	28 11.0	34.0	K
8.7	11.3	20.2	K	9.5	5.5	52.2		9.4	51.6	14.0		9.5	17 11.7	50.8		9.5	12.5	7.1	
9.3	40.0	58.5		9.5	44 37.5	17.2		9.4	59 12.2	11.7		9.1	22.8	45.9		9.5	21.4	29.1	
9.2	31 7.8	15.0	K	9.4	40.8	47.1		9.3	15.9	15.5	B	8.8	30.8	43.4		9.5	53.7	55.5	
9.4	20.9	17.3		9.5	45 23.7	28.6		9.3	31.5	4.1		9.2	38.5	28.2	K	9.4	56.0	18.7	
8.4	45.0	20.1	K	9.2	31.3	7.6		9.5	0 2.1	49.7		9.5	39.5	16.7		9.5	29 5.8	0.7	
9.5	47.5	6.0		9.5	53.1	22.8		9.0	4.0	8.8		9.5	18 4.2	26.1		9.4	42.9	11.2	
9.3	58.9	52.7		9.2	46 12.3	48.5		8.5	29.5	26.6		9.5	15.7	1.2		9.3	56.8	3.3	
9.3	59.4	55.6		9.5	22.6	20.1		9.4	48.8	33.6		9.5	31.6	38.3		8.5	59.1	45.7	
8.3	32 18.5	12.5	K	8.8	23.4	12.6		9.5	1 17.3	51.8		9.5	52.9	57.9		8.6	30 50.2	29.4	
9.4	23.5	43.4		9.0	27.8	5.2		9.4	41.9	11.5		8.6	19 21.5	48.4		9.3	31 8.4	12.2	
8.3	26.9	17.1	K	9.3	32.0	58.5		8.8	2 3.2	41.0		8.3	26.3	23.5		9.2	17.5	57.9	K
9.3	28.3	49.4		9.5	56.1	10.0		9.5	5.6	1.0		6.7	36.1	38.4	G	9.2	19.9	4.8	
9.4	36.6	13.9		7.2	47 13.9	57.4	A	9.4	6.3	36.3		8.3	45.5	36.8	J	8.9	22.2	33.6	
8.9	37.4	31.2	K	9.0	22.3	36.4		9.2	42.8	6.5		8.2	54.6	48.6		9.5	51.6	43.1	
9.5	33 9.2	6.2		8.9	29.0	11.6		8.5	48.2	14.4	G	9.5	20 12.0	30.5		5.3	32 7.8	22.6	K
9.5	15.5	50.3		8.4	29.8	4.3		8.1	50.9	36.9	B	9.1	15.6	32.3		9.4	19.6	15.5	B
9.5	16.0	56.7		8.8	48 10.0	14.6		9.5	4 4.0	0.1		9.5	19.3	53.4		9.5	34.0	52.7	
8.5	40.4	55.5	K	9.1	20.3	57.6	A	9.5	40.0	3.1		9.3	28.6	59.3		9.5	41.4	46.4	
9.3	41.0	19.5		9.1	49 4.3	39.3		9.5	43.1	48.5		9.5	35.0	14.1		9.3	49.5	20.8	
9.3	55.1	35.7		9.5	19.5	1.1		9.5	58.6	43.5		9.4	42.0	9.3		8.7	52.4	23.7	K
9.4	57.1	52.7		9.4	37.0	39.3		8.7	5 26.3	19.2		9.5	21 13.5	8.9		9.2	56.9	27.4	B
9.5	34 0.3	34.2		8.8	53.9	9.0	K	9.4	34.4	8.0		9.3	25.8	19.1		9.1	59.7	5.0	
9.0	40.8	39.8	K	8.9	56.8	11.8		7.3	47.3	18.3	L	6.2	30.6	38.8	K	8.5	33 2.3	54.0	K
9.3	42.3	39.0		9.1	50 31.0	24.6	K	9.3	6 9.7	16.5		9.0	32.1	27.3		8.7	19.2	14.7	K
9.5	35 6.3	19.4		9.3	51 14.3	28.2		9.3	13.9	18.0	B	9.3	32.1	3.2		9.1	21.1	23.1	K
9.3	34.9	12.0		9.3	18.0	45.8		9.0	7 38.3	11.4		9.4	35.3	5.5		9.2	26.7	8.1	
9.4	41.7	47.7		7.1	34.0	2.4	K	9.5	59.5	58.1		6.8	36.6	43.2	K	9.1	26.9	39.8	
9.5	45.8	56.6		9.3	44.2	11.3		8.9	8 5.2	31.1		9.3	48.6	13.8		9.5	34 6.4	0.3	
9.5	36 3.8	11.0		9.5	54.2	15.6		9.5	24.8	42.4		9.4	57.5	2.0		9.5	19.5	8.7	
9.3	15.7	48.7		9.3	54.8	20.0		9.0	47.9	41.0		9.0	22 12.1	13.0		6.9	45.9	6.5	K

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	19h	+44°			19h	+44°			19h—20h	+44°			20h	+44°			20h	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	35 7.2	28.7		7.5	44 24.5	0.5	K	9.5	57 45.4	32.0		8.9	7 43.5	49.8	A	8.8	17 6.7	29.9	
9.0	20.8	48.8		9.5	51.0	43.0		9.2	50.5	7.0		9.5	49.2	6.7		9.2	14.2	43.8	
9.5	37.8	8.2		8.9	45 16.8	12.9		9.5	51.2	39.7		9.1	56.9	58.9	K	9.1	42.3	26.0	
9.0	38.6	25.6	K	9.5	26.2	47.3	A	9.5	58 13.0	13.6		8.5	8 0.0	43.3	A	9.3	18 2.7	20.5	
9.5	41.7	11.1		8.2	26.4	47.0	A	9.5	25.2	51.7		9.5	8.5	55.1		9.5	28.7	56.1	
9.0	36 0.0	21.5	K	9.5	35.0	8.0		9.5	35.9	52.6		9.5	13.8	8.6		9.5	29.7	54.1	
9.5	6.9	36.6		9.4	50.7	37.6		8.8	41.2	9.6	K	8.1	16.3	7.2	B	9.5	31.0	47.0	
7.0	7.6	27.2	K	9.3	57.5	44.5	A	9.5	47.3	43.1		9.5	53.3	1.2		9.4	50.8	7.8	
7.8	12.7	11.6	K	9.5	46 6.0	24.9		9.0	59 6.2	45.5	K	9.3	55.3	57.9	B	9.4	51.2	5.3	
9.5	13.8	0.1	B	9.5	12.1	11.5		9.5	31.3	40.0		9.4	58.4	41.5	A	9.5	51.8	7.1	
9.5	20.4	0.1	B	9.5	44.8	34.1		9.4	50.9	52.8		9.4	58.9	47.5		9.5	53.4	40.1	
9.5	24.0	16.5		9.5	47 3.6	21.4		8.4	52.4	34.1	A	9.5	9 0.7	8.6		9.3	57.0	32.0	
9.5	26.7	21.3		9.5	4.5	19.2		9.5	54.3	59.9		9.4	4.0	23.6		9.5	58.5	13.4	
9.1	38.3	33.3	K	9.5	30.3	48.6		9.2	0 14.6	59.0	K	9.3	19.8	37.6		9.3	19 1.7	57.0	
9.4	51.5	26.0		9.3	49.6	18.4	K	8.2	15.1	23.9	K	9.3	36.9	57.7		8.8	1.9	9.3	B
9.4	37 15.4	19.7		9.5	54.9	29.7		9.3	23.1	41.2		9.5	37.5	42.5		9.1	7.1	28.2	
9.0	27.5	18.4		8.3	48 5.1	14.3	K	9.4	31.0	43.9		7.8	43.0	25.6	A	7.9	14.7	13.3	K
9.5	30.2	20.7		9.5	30.2	6.5		9.5	1 3.9	57.4		9.3	44.8	58.3		9.4	20.0	35.3	
9.1	45.4	30.4		9.3	35.7	5.8		9.5	7.1	41.2		8.2	47.4	30.0	A	9.5	20 7.7	21.0	
9.5	38 15.5	38.6		8.9	45.6	3.0		8.0	24.8	35.5	A	9.4	55.0	6.5		9.5	8.5	16.7	
8.8	21.6	41.4	K	9.5	49.4	41.7		9.4	37.5	15.1		9.5	57.6	43.5		9.2	50.4	16.3	
9.1	49.1	56.9		9.5	49 5.2	12.9		9.5	47.2	9.6		8.1	10 5.0	35.2	B	9.4	21 7.5	36.6	
9.5	58.3	16.4		9.2	10.5	50.2	A	9.0	2 1.8	54.8	K	9.4	5.2	25.6	B	8.7	12.0	55.0	K
9.1	39 1.9	21.9		8.5	38.9	27.8	K	9.5	9.4	29.9		9.5	5.2	30.9		8.4	22.7	56.5	K
9.4	3.0	30.0		9.5	56.8	7.3		9.0	10.7	14.4	K	9.1	6.0	49.8	A	9.5	27.4	27.0	
9.0	18.2	3.2		9.5	50 20.3	41.9		9.1	45.3	35.0	A	9.5	11.2	4.0		9.4	55.7	3.5	
9.5	29.1	35.5		9.5	33.3	59.0		7.0	55.6	43.5	A	8.5	16.3	40.3	K	9.5	22 9.6	13.9	
9.5	30.8	4.3		9.4	51 3.9	11.4		9.5	3 10.3	52.6		9.5	17.8	42.9		9.5	39.4	24.8	
9.4	39.0	18.0		9.5	12.0	44.0		8.0	14.7	9.9	K	9.5	22.5	46.1		9.1	52.2	37.8	
9.4	51.3	12.6		8.5	31.2	26.0	K	7.7	23.1	47.8	A	9.5	11 2.6	0.0		9.5	56.7	8.8	
9.4	58.5	48.6	B	9.5	39.7	28.8		9.5	33.3	6.3		9.3	10.7	42.5		9.5	23 12.9	40.7	
8.0	40 11.9	34.5	L	9.5	52 4.5	27.6		9.5	43.1	33.9		9.5	11.1	1.5		9.5	18.4	36.7	
9.5	21.6	18.5		8.7	8.7	20.5	K	9.5	44.5	23.7		9.3	13.6	41.8	B	9.5	20.1	34.6	
3.0	27.2	46.5	S	9.3	19.9	17.7	B	7.7	47.7	46.0	A	7.5	53.1	53.2	A	9.0	20.9	29.6	B
9.4	41 1.2	56.5		9.0	33.0	39.8		9.5	48.9	55.7		9.0	12 1.8	1.3	B	9.5	31.8	57.4	
8.0	5.5	36.7	K	9.5	35.8	49.4		9.5	4 22.7	17.0		9.2	6.5	1.8		8.8	43.4	28.0	
8.9	18.6	33.5	K	9.4	45.3	5.9		8.9	30.8	45.3	A	8.8	33.4	34.2		9.5	46.3	43.9	
9.3	21.5	45.3		8.8	47.5	22.7		9.3	39.0	15.1		8.5	44.2	27.0		9.5	54.5	16.2	
9.3	27.5	5.6		9.5	53 10.2	12.9		9.5	41.4	25.3		9.4	53.6	29.3		8.0	56.4	36.2	L
9.5	32.8	8.0		9.4	13.2	49.4	B	9.4	47.4	2.1	B	9.5	13 18.4	40.1		9.5	58.3	3.7	
9.5	34.4	36.9		9.5	13.4	51.9		9.5	49.3	1.5		8.2	21.7	37.1	G	9.3	24 22.4	30.3	
9.2	38.4	42.1	K	8.7	28.1	42.7		9.5	52.3	6.6		7.8	22.0	56.5	K	9.5	26.3	7.1	
7.7	43.9	12.8	G	9.1	54 3.0	34.7		9.5	55.9	36.0		8.8	25.8	16.2		9.1	27.9	45.8	
9.2	44.5	28.1		9.5	10.9	2.1		9.5	56.8	21.1		9.0	35.7	38.0		8.6	32.0	2.9	K
9.5	58.0	34.5		9.5	16.7	22.4		9.1	5 10.2	58.5	A	9.3	14 5.0	54.6	A	9.5	38.6	47.0	
9.5	42 11.0	54.8		9.4	33.8	43.8		9.3	19.2	59.7	A	7.8	14.4	25.6	K	7.8	57.7	0.2	K
9.4	37.1	34.3		9.3	42.7	11.0	K	9.4	20.9	16.6	B	7.8	41.0	45.4	A	9.3	25 1.1	41.0	
8.8	37.7	29.3	K	9.3	50.8	7.4		7.0	27.1	35.2	B	9.4	47.8	3.5		9.3	4.5	33.5	
8.9	56.1	14.9	K	9.1	55.0	24.7		9.5	37.8	38.5		7.0	15 4.9	54.2	A	9.5	9.2	6.8	
9.4	43 9.0	29.1		9.5	55 6.1	34.3		7.5	45.7	10.9	L	9.5	23.5	56.3		9.2	11.0	11.8	B
9.5	29.2	32.0		8.6	7.7	8.5	K	9.1	6 8.8	34.8		9.4	29.0	5.1		8.0	16.0	57.8	K
9.0	39.4	32.1	K	9.4	56 21.4	46.7	B	9.2	9.5	19.7		9.1	29.7	48.7	K	9.2	22.2	9.6	
8.3	40.0	48.8	A	9.1	22.2	57.8		9.2	34.7	9.5		9.0	48.8	24.7	K	9.4	34.4	5.0	
9.5	40.6	37.6		9.5	50.6	52.0		9.5	54.2	29.3		8.4	16 0.5	5.3		9.3	26 5.0	56.5	
9.5	42.2	53.0		8.8	58.9	19.8	K	9.3	58.8	55.7	B	9.5	4.9	25.0		9.5	22.0	49.3	
9.5	50.0	6.3		9.4	59.5	29.2		9.5	7 17.2	44.5		8.7	10.6	8.8		9.5	37.2	35.4	
8.8	44 19.2	29.9	A	9.2	57 17.8	37.3	K	9.0	18.7	2.6		9.3	34.2	22.8	K	9.5	39.4	16.1	
8.4	19.8	36.2	A	8.7	31.3	2.5	K	9.5	30.3	3.7		9.4	52.0	2.0		9.3	42.5	24.5	
9.5	21.2	50.7		9.5	31.5	58.0		9.2	32.8	38.9	K	7.7	52.5	21.7	K	7.8	47.6	41.0	G
8.9	22.3	43.1	A	9.4	43.3	2.4		9.2	40.9	46.4	K	9.5	56.4	13.5		9.0	27 5.3	41.3	

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	20ᵐ	+44°			20ᵐ	+44°			20ᵐ	+44°			20ᵐ—21ᵐ	+44°			21ᵐ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	27 6.9	17.0		8.3	38 59.4	41.3	K	8.2	48 29.5	37.7	A	9.5	57 40.0	39.6		7.5	8 20.5	34.3	B
9.5	37.4	4.4		9.5	39 8.7	16.5		8.2	30.6	50.1	A	9.2	51.3	14.4		9.4	21.8	43.7	
7.3	53.7	29.5	G	8.9	9.3	38.2	K	9.5	57.1	2.2	B	9.5	58 11.4	33.8		9.4	24.9	0.5	B
9.4	28 28.5	44.8		9.5	10.7	13.2		7.2	49 3.0	33.7	K	9.3	20.3	24.8		7.6	29.3	55.8	K
7.0	47.0	40.6	A	9.5	27.3	43.7		9.4	10.1	58.9		8.0	30.6	47.4	K	9.0	32.1	38.7	
8.7	56.8	19.6		9.2	54.8	41.9		9.3	22.4	46.8		9.3	42.1	11.3		9.5	38.0	51.6	
7.8	29 16.8	37.6	A	9.5	59.5	1.0		9.4	40.3	17.8		8.8	56.4	48.9	K	8.8	48.8	2.3	R
9.5	24.4	18.5		9.5	40 23.3	15.4		8.3	41.9	35.3	K	8.1	59 0.8	34.5	K	9.5	56.5	9.8	
9.5	38.0	7.4		8.3	55.7	16.2	K	9.4	55.9	12.4		9.5	27.5	58.5		9.5	9 23.6	57.3	
9.2	40.7	20.3		8.5	58.7	16.5	K	9.4	50 2.1	32.8	B	9.5	28.6	8.1		9.5	30.9	29.4	
9.3	44.2	51.3		9.3	41 1.3	46.7		8.3	15.6	43.5	R	9.1	30.0	18.2		9.5	32.2	42.2	
9.0	30 15.7	26.3		9.0	4.2	44.5		9.4	15.8	50.3		9.5	30.3	25.0		9.5	48.9	17.2	
9.5	24.1	17.0		9.1	24.4	18.5	K	9.0	16.7	18.4	K	8.6	55.0	25.5	K	9.3	10 13.4	25.2	
8.2	31.7	46.6	A	8.6	34.1	59.7	A	9.0	23.6	18.1	K	9.2	0 0.6	6.4		7.2	18.0	21.0	L
9.5	44.9	33.3		9.5	49.7	28.5		9.5	31.4	58.5		9.1	6.4	54.0		9.4	22.5	57.9	
8.8	31 8.5	25.8	K	9.4	50.0	45.8		9.5	41.8	14.6	B	9.5	16.3	28.0		9.5	35.8	42.3	
9.3	39.7	4.1		9.5	57.2	8.3		9.3	51 11.5	13.3		9.4	19.4	41.0		8.7	47.5	12.4	
9.5	52.2	33.8		9.5	42 16.5	38.0		9.5	26.4	2.3		9.5	43.2	13.7		9.1	50.2	7.5	
8.2	55.1	24.6	K	9.2	32.6	57.6	K	6.7	29.6	22.7	K	9.5	44.6	11.5		9.5	58.6	10.4	
9.2	32 16.3	52.4	A	9.5	38.4	49.0		9.2	35.0	58.3		8.1	53.8	12.7	B	9.5	11 8.5	3.9	
8.9	24.7	2.2	K	8.7	42.8	20.1	K	8.3	49.9	46.3	R	8.3	1 11.9	41.2		9.3	13.0	12.4	
9.5	40.4	33.2		8.5	47.9	14.3	K	9.5	56.5	4.2	B	9.5	15.3	55.6		9.1	22.9	8.4	
9.0	51.6	13.9	B	9.4	48.7	15.5	B	9.1	58.5	46.8		9.5	39.4	16.2		8.8	33.6	19.2	K
8.3	33 6.7	5.3	K	8.9	52.5	4.1	K	9.1	58.9	30.0		9.1	48.7	12.5		9.0	45.0	29 5	
9.0	35.7	7.7	K	9.4	55.3	29.3		9.5	52 24.3	16.2		9.2	49.2	5.3		9.5	12 0.7	12.0	
8.0	38.1	18.0	B	9.1	57.4	9.7	K	8.8	37.5	55.1		9.3	49.7	24.6	B	9.5	58.5	38.0	
9.2	43.1	19.1		9.4	43 0.7	13.7		9.3	42.7	8.9		9.3	53.4	32.7		9.4	13 2.1	27.1	
9.5	46.3	24.3		9.2	0.7	49.8		9.3	43.0	56.7		9.5	56.1	24.6		8.3	15.3	50.5	K
9.2	51.8	28.0		9.5	26.2	8.0		7.9	46.8	13.8	G	9.0	57.4	46.8		9.2	22.7	13.4	
9.4	58.1	30.4		7.6	27.1	54.7	A	9.3	47.2	58.7	B	7.5	2 0.9	5.4	K	9.2	29.4	43.8	
9.5	34 6.3	41.5		9.5	37.0	48.7		9.4	56.0	59.0		7.5	35.2	22.8	K	9.1	40.8	59.2	
9.5	7.0	1.7		9.0	40.2	43.8	A	8.4	56.8	29.0		9.5	3 43.3	31.7		9.3	54.7	11.6	
9.4	17.1	8.6		9.3	44.7	40.3		9.5	53 10.4	23.3		9.0	56.2	40.0		9.4	56.5	21.1	
9.3	29.4	59.6		9.4	44 11.5	52.8		9.5	17.2	55.1		9.4	57.8	27.0		9.3	59.1	22.8	B
9.4	43.3	44.8	R	9.5	23.9	26.4		9.3	18.7	35.1		8.8	4 2.7	18.0		9.0	14 21.7	8.1	
9.4	35 6.6	30.8		8.7	59.6	48.8	A	9.4	21.7	33.9		9.1	7.3	6.3		9.5	31.9	39.0	
9.4	8.8	43.3		9.4	45 7.1	18.5		9.4	24.3	30.7		8.3	13.4	38.4		9.5	35.2	36.5	
8.1	17.4	15.5	B	9.2	18.2	32.4		7.7	54 3.9	13.5	K	6.8	47.0	54.8	L	8.7	46.8	26.7	
9.5	50.6	22.2		9.5	33.8	25.6		9.5	18.6	4.4		9.5	56.7	40.5		8.9	15 13.5	51.5	
9.5	36 16.7	36.5		8.9	46 0.8	10.3		9.5	34.7	32.7		9.4	5 6.6	53.0		9.5	23.5	41.0	
1.7	30.7	45.6	K	9.0	5.5	18.1		7.2	43.8	25.9	K	8.8	7.0	58.2	B	9.5	29.0	10.6	
8.9	39.2	7.8	K	8.8	16.5	30.7	K	9.0	48.3	40.6	K	9.5	11.2	12.8		9.2	45.0	6.3	B
9.5	48.0	26.1		8.8	19.7	45.9	A	9.1	49.5	51.3		9.3	11.2	49.3		9.5	47.6	10.1	
9.2	54.4	20.1	B	8.8	25.0	47.7	A	9.4	50.2	47.1		9.5	17.8	32.9		9.2	50.7	12.1	K
9.1	59.9	50.3	A	9.5	34.2	46.0		9.3	54.2	57.1		9.5	28.0	13.5		9.0	51.6	10.3	K
9.4	37 1.4	55.3		9.3	49.3	44.8	B	9.5	58.8	27.2		9.5	32.8	59.7		9.0	52.1	11.0	K
9.2	16.1	18.1		8.9	49.7	44.3	A	9.5	55 4.2	5.5		9.4	49.4	45.0		9.2	54.5	27.7	
9.5	36.5	18.4		9.0	56.6	34.2	K	9.1	26.4	11.3		8.0	6 1.5	52.6	K	9.5	59.3	22.5	
9.4	48.2	49.5		9.1	58.9	10.8		8.9	35.1	13.0		9.5	2.4	21.1		9.5	16 14.7	54.4	
9.1	38 4.2	44.7		9.1	47 5.0	13.1		8.8	40.2	55.6	K	9.5	3.9	27.3		9.4	22.4	6.8	
9.0	16.2	35.6		9.5	5.9	47.8		9.5	46.7	21.0		9.2	8.6	54.0		9.5	22.5	46.3	
9.1	16.3	25.7		9.5	29.0	57.7		9.4	53.1	53.6		9.3	20.5	12.3		9.5	33.8	25.7	
9.0	19.7	24.3		8.8	38.6	10.2	B	9.4	56 19.4	55.5		9.5	46.5	9.3		9.3	42.6	38.3	
8.5	26.5	45.6	A	9.5	55.5	34.5		9.4	25.5	7.4		9.0	49.3	53.7	K	9.2	52.0	29.1	B
8.7	27.1	29.3		8.3	58.5	55.6	A	9.5	56.6	46.8	B	8.6	57.2	41.9		8.9	58.9	16.5	K
8.5	34.0	8.5		9.1	48 4.0	8.6		9.5	57.2	5.1		9.4	7 28.4	10.0		9.5	17 24.9	45.1	B
9.2	36.4	30.1		6.2	15.7	37.9	A	9.1	59.7	22.7		9.5	33.0	19.1		9.3	29.7	18.8	
9.0	37.1	27.0		9.5	17.7	7.5		9.2	57 1.8	59.5	R	9.4	50.2	52.3		9.5	55.5	53.1	
9.2	47.9	44.0		9.5	24.3	17.1		6.8	15.7	13.6	G	9.5	8 14.3	18.4		9.0	18 25.1	45.2	
9.5	56.8	48.6		9.1	28.2	8.1		7.6	27.6	2.9	G	9.1	18.6	59.0		9.5	58.0	11.3	

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	21h	+44°			21h	+44°			21h	+44°			21h	+44°			21h—22h	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	19 1.3	56.1		8.5	28 3.5	26.8	K	9.4	38 24.9	4.0		9.3	48 45.2	24.1		7.0	59 58.6	24.5	K
9.4	1.4	11.0		9.5	8.7	43.5		9.5	38.3	20.4		9.4	49 22.0	34.6		8.3	0 1.1	40.4	
9.5	6.8	45.0		9.5	11.7	10.0		9.4	40.0	47.5		9.3	43.0	32.1		4.7	10.0	18.9	G
9.5	55.2	50.7		9.5	31.0	19.6		9.5	44.0	43.5		9.0	43.6	6.8		6.3	21.4	33.0	K
8.0	20 22.8	2.9	B	4.1	31.5	57.4	A	9.4	47.9	1.8		7.7	45.7	16.0	K	9.4	42.0	26.1	
8.9	23.7	32.1		9.2	29 3.0	53.5	K	9.3	55.4	13.3		8.7	52.4	1.8		8.5	44.0	41.6	
9.5	24.5	15.5		9.5	12.0	44.1		8.6	39 7.0	39.4	K	9.5	52.4	0.8		9.1	1 5.9	8.4	
9.5	35.1	35.2		9.3	14.3	57.2	K	9.2	14.2	53.7		9.5	50 3.5	9.8		9.1	7.5	38.1	
9.5	52.0	37.1		9.5	29.2	33.6		8.5	27.9	27.2	K	8.9	10.4	38.5		9.4	29.3	54.6	
9.4	57.2	41.3		9.4	34.7	55.1		9.5	29.7	8.8		9.5	31.3	6.2		9.0	37.9	26.0	
9.5	21 6.8	21.5		9.4	34.9	27.0		9.5	50.9	27.0		9.5	50.3	2.9		9.1	42.7	32.0	
8.7	20.3	30.8	K	9.1	46.8	9.1	B	9.4	58.2	24.3		9.5	58.0	43.3		8.6	46.3	10.7	
9.5	21.7	55.4		9.5	55.7	4.1		9.5	40 4.9	12.6		9.3	51 3.4	30.5		9.5	47.8	58.4	
7.8	33.9	15.6	K	9.2	30 5.8	33.7		8.7	17.9	29.5	K	9.4	15.6	44.0	B	9.5	52.7	45.5	
9.5	42.6	50.7		9.3	15.3	3.1		9.3	23.8	29.3	B	9.5	17.2	58.5		9.4	2 6.9	27.3	
9.5	50.2	44.0		9.5	27.4	0.8		8.7	25.0	26.2	K	9.5	41.7	12.0		8.5	46.8	34.4	
8.9	22 3.7	0.2	K	6.7	33.9	43.7	A	9.3	25.9	32.1	B	9.2	52 2.4	29.4		9.1	51.5	21.5	
9.5	5.9	6.0		9.0	40.0	57.5	K	9.5	56.7	22.5		9.4	8.7	3.7	B	6.9	3 9.5	8.9	K
9.5	7.5	13.3		8.8	42.6	6.8	K	8.8	41 7.6	12.3	K	9.0	16.0	17.0		6.9	20.3	8.3	K
9.4	21.2	36.8	K	9.3	45.1	42.0		9.2	21.0	46.6		8.8	19.2	36.4	K	9.4	22.3	8.1	B
9.5	26.5	35.9		9.5	51.5	48.3		9.5	28.3	23.9		9.5	21.8	5.2		9.1	4 13.0	27.5	
9.5	31.3	10.7		9.4	31 7.2	52.3		9.5	39.4	5.4	B	9.0	23.2	13.0		9.5	32.8	12.6	
9.0	34.5	54.3		9.4	7.5	11.7		9.5	48.3	26.7		8.9	27.6	47.4		9.5	38.0	46.0	
9.3	37.8	32.1	B	9.4	21.4	10.2	B	9.5	51.0	36.1		9.3	44.1	49.3	B	9.5	5 6.2	9.4	
8.0	43.3	56.8	K	9.0	23.4	19.2	K	9.2	42 6.2	20.4		9.1	45.5	28.1		9.5	21.7	15.3	
9.5	44.7	0.4		9.0	29.5	32.7		8.5	10.3	18.4		9.5	50.4	10.1		9.5	39.9	36.3	
9.4	46.1	8.2		9.5	31.1	41.0		9.5	17.1	6.4		9.5	53 0.7	38.0		9.5	6 0.1	8.8	B
9.5	23 13.8	57.7		9.1	42.4	48.0		8.9	28.0	56.9	B	9.1	3.9	30.5		8.9	10.0	51.0	
9.4	25.9	22.3		6.4	54.3	2.5	K	9.5	35.0	0.1	B	9.0	21.7	50.9	B	9.3	23.6	34.0	
9.4	27.7	32.2		9.3	32 6.4	4.4		9.2	47.2	30.3		9.3	23.9	46.9		8.8	34.2	51.3	
9.3	35.6	3.8		9.5	53.8	49.5		9.5	43 0.0	37.1		9.4	54 0.1	18.8		8.0	55.9	3.6	K
6.5	40.0	17.1	K	8.5	33 31.4	21.6	K	9.5	19.3	22.5		8.0	5.9	16.7	L	9.1	7 46.8	1.4	
8.8	45.6	21.5	K	9.5	32.6	38.3		9.2	34.9	43.2		8.6	23.6	59.1		6.0	51.1	43.5	K
9.0	46.4	32.9		9.3	49.7	39.4		9.4	41.8	54.6		8.8	26.3	54.0		9.3	55.8	53.2	B
9.1	54.3	34.4		9.2	58.5	31.6	K	9.4	48.0	8.0		9.3	49.0	39.0		9.5	8 5.5	56.7	
9.4	56.4	9.3		9.2	59.1	16.2		9.5	58.5	24.4		9.1	55 6.4	51.8		9.4	7.2	47.1	
8.9	24 0.7	34.5	K	9.1	34 0.3	4.3		9.2	44 40.3	55.0		9.2	9.0	48.1		9.5	18.0	15.5	
9.1	24.5	28.9		9.5	17.8	8.9		9.5	42.9	27.0		8.7	31.0	32.9	K	9.5	40.8	0.2	
9.4	28.2	30.2		9.5	26.5	24.0		9.0	47.9	13.0	B	9.4	36.6	33.1		9.4	51.9	3.0	B
6.7	36.2	51.5	A	9.5	42.5	6.1		9.1	50.1	13.8		8.8	59.7	49.6		8.9	55.4	36.7	K
9.5	51.6	54.7		9.0	35 8.4	39.2		9.5	58.5	58.0		9.2	56 3.3	54.1		8.7	9 20.0	48.7	
9.2	55.0	11.0		9.2	18.6	27.3		9.5	45 3.2	40.8	B	9.5	9.6	8.7		9.4	30.4	47.5	
6.7	58.0	14.0	K	9.5	39.8	21.6		9.4	16.0	9.5		9.2	11.9	41.2		7.3	10 1.8	22.0	G
9.0	25 35.1	31.5	K	8.8	58.1	23.4		9.5	28.1	51.0	B	9.0	19.7	28.6		9.4	11.9	25.6	B
9.2	37.2	48.3		9.0	36 16.5	53.5	K	9.4	31.7	8.9	B	9.4	31.6	56.0		9.1	36.8	44.6	
9.3	42.3	12.7	B	9.5	16.8	22.2		9.5	33.2	47.0		9.1	57 10.2	36.2		9.5	46.0	41.2	
9.3	44.9	43.9		9.5	29.4	9.5		9.2	35.4	15.1		8.8	21.3	55.7		8.0	11 25.9	33.4	B
9.4	51.9	16.2		9.0	47.1	35.6		9.3	53.6	59.7		9.4	55.9	47.9		9.4	38.3	54.7	
9.5	54.1	12.8		9.5	55.6	14.5		9.1	46 28.7	49.2		8.0	58.2	1.6	K	9.5	41.0	57.6	
9.5	58.5	7.9		9.3	55.8	33.2		9.5	36.4	22.3		9.5	58 1.0	20.4		9.4	41.1	19.3	
9.4	26 2.4	50.6		8.4	37 19.6	9.5		9.5	52.7	0.4		8.5	11.5	34.1		9.5	12 19.5	33.5	
9.0	4.2	30.4	K	9.5	21.0	27.5		9.1	56.4	33.2		9.5	22.0	8.2		9.5	42.8	8.6	
8.5	7.5	53.0	A	9.5	21.0	31.9		9.5	47 10.0	54.8		9.5	26.0	11.8		9.5	50.0	16.9	
9.4	19.0	36.6		9.4	37.4	12.1		8.7	49.4	46.4	K	9.5	34.7	50.0		9.3	13 27.5	27.3	
9.5	19.8	40.5		9.5	43.6	7.0		8.7	52.0	38.7		8.7	39.5	41.9		9.1	34.6	10.1	
9.5	31.6	6.4		9.3	50.9	9.0		9.4	52.3	20.5		8.2	59 12.5	3.8	K	9.3	34.8	21.6	
9.4	58.0	46.7		9.3	58.2	52.0		9.5	48 8.6	13.9		9.1	13.7	26.0		9.5	47.1	42.5	
8.9	27 29.4	20.1		9.2	58.4	4.2	B	9.2	10.0	52.4	A	9.5	13.9	0.1	B	9.4	14 0.7	19.1	
9.0	36.5	32.8	K	9.5	38 15.8	55.0		9.2	31.5	33.3		9.5	39.7	24.4		9.4	23.6	31.2	
9.4	54.6	38.2		9.1	19.1	57.3		8.1	33.7	52.1	A	9.3	54.6	21.0	B	9.4	32.4	40.5	B

4101—4160				4161—4220				4221—4280				4281—4340				4341—4400			
	22ᵘ	+44°			22ᵘ	+44°			22ᵘ	+44°			22ᵘ—23ᵘ	+44°			23ᵘ	+44°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	14 40.8	2.0		8.8	26 31.2	34.8		9.4	39 19.8	55.1		9.1	49 49.0	17.2		9.5	3 27.8	10.7	
9.5	52.0	17.5		9.4	54.5	31.8		9.5	22.6	16.6		9.5	49.7	8.9		8.3	51.9	18.8	K
9.4	52.0	7.5		9.0	55.3	9.3		9.5	23.2	42.2		9.5	50 23.4	13.4		8.5	55.8	26.0	K
9.4	54.0	7.1		9.0	27 12.9	23.0		8.6	34.7	50.8		9.5	25.0	3.4		9.3	4 2.0	21.6	
9.5	15 3.7	7.7		9.5	19.7	1.3		9.3	37.3	7.8		9.5	46.8	33.2		9.5	5.6	53.2	
8.9	23.9	55.3	K	9.5	40.1	44.4		9.3	39.8	2.6		9.5	48.8	52.4		9.3	7.7	9.7	
9.5	41.0	17.1		9.4	28 2.2	5.7		9.4	43.0	42.5		9.0	51 12.3	8.4		7.3	10.6	44.0	A
9.5	45.3	43.7		9.5	8.0	52.0		9.1	49.2	43.9		9.4	16.4	21.5		9.4	52.4	59.6	B
9.5	48.5	41.0		7.0	22.8	15.1	K	9.5	52.7	57.0		9.5	33.2	44.2		9.1	5 29.6	28.2	
9.4	16 7.2	5.1		9.2	38.7	20.3		9.5	40 12.8	6.1		9.4	43.0	16.3		8.2	34.1	1.9	K
9.5	22.8	40.1	B	9.5	46.8	19.7		9.3	21.9	59.1		9.4	52 11.8	56.8		9.2	54.0	51.1	
9.3	23.5	43.1		7.0	29 1.4	24.6	K	8.0	33.8	0.6	K	9.0	13.6	32.7	B	8.6	58.5	48.2	K
8.8	23.5	17.8		9.3	30.8	29.7	B	9.4	41 30.7	58.6		8.7	15.6	30.3	B	9.2	6 18.8	11.1	
8.2	24.1	42.3	L	9.3	32.0	41.2		8.2	31.5	37.5	K	9.5	47.5	16.8		8.9	39.1	6.4	
9.5	56.0	11.1		9.2	47.3	29.7	B	9.5	40.7	45.4		9.5	51.7	9.0		9.3	44.4	16.2	
8.8	17 9.5	33.1		9.5	48.1	57.5		9.3	43.4	22.3		9.5	53 0.0	41.6		9.2	47.5	26.4	
8.9	17.6	46.8		9.5	55.0	26.4		9.3	52.4	36.9	B	9.4	1.0	48.3		9.5	57.2	8.1	
8.8	19.6	49.5		8.7	30 2.9	41.6		9.5	53.6	54.8		9.4	30.4	17.4	B	8.5	7 23.5	21.4	
9.1	23.0	11.1	B	8.7	4.9	49.2	K	9.4	42 0.3	38.1	B	9.3	32.5	46.9		9.5	54.3	20.6	
7.5	30.0	36.7	A	9.5	9.1	13.5		8.0	4.1	38.4	K	9.4	32.8	3.1		9.0	8 17.9	14.8	
9.1	50.6	29.8		9.5	31 3.3	2.2		9.3	31.0	18.7		9.2	52.6	10.1		9.3	38.8	24.4	
9.5	55.5	41.1		9.5	30.8	12.1		8.6	35.8	18.0	B	6.5	54 1.4	35.9	G	8.8	59.4	21.6	K
9.5	18 9.7	7.5		7.3	32.9	39.4	K	9.5	43 6.1	34.6		9.5	6.2	24.8		9.0	9 20.4	8.6	
9.5	18.2	14.5		9.5	57.3	27.0		9.4	17.8	49.8		9.4	26.9	2.6		9.4	34.3	4.5	
9.5	26.1	34.3		6.8	32 1.2	25.9	G	9.4	28.0	22.4		9.4	36.8	0.8		9.5	43.0	54.4	
9.5	41.8	15.8		9.5	37.4	4.0		8.2	28.4	39.2	K	9.5	43.8	47.8		9.4	10 13.8	7.1	
9.4	19 26.7	12.7		9.5	46.1	50.5		9.3	30.5	12.4		7.9	59.7	43.9	K	9.5	24.0	33.0	
9.5	40.8	0.2		9.5	33 0.5	59.9		9.4	43.3	5.1		9.1	55 0.8	37.7		6.2	29.7	24.0	K
9.1	44.0	34.2		8.8	1.4	34.3	K	8.7	44 17.7	43.9	K	8.5	29.9	4.6		9.5	38.5	25.3	
8.8	48.4	0.1		9.4	7.7	11.9		8.8	22.2	22.5		9.5	34.7	57.1		9.3	48.4	53.6	
8.8	56.3	7.8		9.3	11.3	43.0		8.0	22.9	9.9	G	9.4	42.3	52.0		9.5	53.7	0.1	
9.4	20 16.8	20.2		9.3	30.2	7.2		9.5	44.3	26.8		9.5	52.9	5.7		9.4	11 4.3	54.8	
9.5	28.8	7.7	B	8.5	37.8	50.0	A	8.3	45 3.1	44.5	K	9.0	56 28.3	13.0		6.5	8.4	42.2	K
9.5	51.6	39.1		9.1	42.9	29.0		8.5	5.4	43.1	K	9.5	36.5	18.6		8.8	49.2	38.5	K
9.3	53.3	49.4		9.3	34 17.1	7.1		9.3	15.0	55.8		8.6	37.0	0.8		9.3	57.5	55.5	
9.5	54.4	47.5		9.5	48.0	34.7		9.5	22.7	51.7		9.5	37.8	5.7		9.3	59.0	10.7	
8.9	56.2	22.9	K	7.3	51.0	15.0	K	9.2	22.8	59.7		9.5	57.0	35.1		9.5	12 6.9	49.8	
8.7	21 3.6	26.5	K	9.4	35 7.5	4.6		9.5	46 1.5	22.0		9.5	57 17.9	25.0		6.8	13.9	20.9	K
9.5	5.8	10.3		9.5	12.0	30.6		9.5	15.2	0.7		9.5	34.0	8.6		9.5	31.0	8.8	
9.3	22 10.0	26.4		8.7	19.6	26.2	K	9.5	36.5	15.3		8.8	40.0	41.2	K	9.5	32.7	47.9	
8.8	26.2	18.7		9.5	28.9	2.6		9.4	37.2	39.7		9.4	42.9	55.0		9.4	55.7	1.9	B
9.1	44.6	47.3		9.3	36 7.4	45.5		9.2	41.0	16.0		9.4	46.5	49.8		9.5	13 10.6	8.2	
8.9	44.8	43.2	A	9.2	8.7	21.3		8.1	45.3	55.1	A	9.1	58 18.6	52.3		9.1	18.5	35.7	
9.4	23 0.9	41.8	A	9.5	28.5	35.5		9.5	47 3.0	50.0		9.5	36.0	31.0		9.3	23.8	11.1	
9.2	23.8	17.3	B	9.1	33.2	30.6		9.5	21.1	58.0		9.5	52.0	27.1		9.1	49.2	12.1	
9.1	29.4	6.9		9.5	37.4	37.5		9.4	40.0	25.1	B	9.5	59 0.5	33.7		9.1	14 29.0	1.0	
8.0	29.9	16.5	L	9.4	44.6	55.2		9.5	41.6	55.0		9.5	20.4	35.7		9.5	42.2	43.8	
9.1	30.1	50.6	A	9.5	51.1	9.0		9.5	59.9	4.5		9.5	40.3	41.6		9.5	42.3	46.8	
9.3	44.8	11.9		8.3	54.0	46.6	K	9.5	48 2.1	54.7		9.4	55.3	42.0	B	8.1	51.9	23.2	
9.2	44.8	50.4	A	9.0	56.3	59.0		9.4	6.0	4.8		9.4	0 8.5	8.2		8.9	56.3	30.1	
8.1	55.2	28.2	K	9.4	56.7	28.5		9.5	9.4	0.8		9.4	21.5	20.8		9.3	15 15.1	26.3	
8.7	24 18.5	35.8	A	8.8	56.8	29.4	B	9.4	38.6	53.9		9.5	22.0	32.3		9.2	24.2	31.3	B
9.5	26.0	57.2		9.5	37 4.7	25.4		8.2	40.5	48.8	K	9.5	59.1	54.5		9.3	42.8	39.4	
7.5	57.2	24.2	K	9.4	37.0	24.4		9.1	44.9	40.6	B	9.0	1 11.6	33.7		9.5	16 4.0	40.4	
9.5	25 11.6	14.2		9.1	53.8	14.8		9.5	50.5	45.1		9.0	34.1	5.6		9.2	12.5	20.0	
9.2	50.5	31.7		9.5	38 11.6	27.1		9.5	54.9	23.6		9.5	34.7	38.5		8.5	14.6	11.6	K
9.2	52.7	33.5		8.5	42.9	3.8		8.3	49 13.9	4.5	B	9.5	58.3	30.9		9.0	20.4	11.2	
9.5	26 1.3	34.7		9.1	49.4	55.6	B	9.4	21.3	18.5		9.5	2 41.9	13.1		9.5	32.5	4.8	
9.3	24.0	47.3		8.9	57.8	5.8		9.1	22.2	47.2		8.0	3 13.0	4.8	K	8.5	35.6	59.9	B
9.2	24.7	54.4		9.5	39 18.0	24.2		9.5	45.1	1.4		9.1	22.4	40.9		9.1	37.3	59.6	

4401—4431			
	23h	+44°	
m	′ ″	′	
9.4	16 52.5	35.2	
9.4	17 11.0	3.5	
9.1	20.8	41.1	
8.9	34.2	58.7	A
9.5	47.3	1.1	
9.0	50.4	40.4	
9.1	50.9	15.4	B
9.5	51.1	7.6	
9.5	18 12.2	39.7	
8.6	16.3	26.5	
9.3	19.7	47.0	
9.5	35.4	31.1	
8.5	38.1	8.6	
7.5	51.9	32.5	K
9.5	54.8	1.3	
9.4	19 0.8	45.3	
8.0	4.6	34.2	K
9.0	7.5	14.2	
7.2	40.3	32.1	K
9.5	20 15.8	2.2	B
7.0	26.0	34.2	K
9.5	32.8	29.4	
9.5	21 12.3	15.4	
7.3	34.0	53.7	K
9.3	53.9	32.2	
9.1	22 0.1	5.8	B
8.7	2.0	28.0	
8.5	42.1	58.2	K
9.1	58.1	59.0	
8.5	59.4	40.4	
9.4	23 3.0	21.0	

4432—4462			
	23h	+44°	
m	′ ″	′	
8.3	23 54.3	12.4	
9.5	24 4.6	7.4	
8.8	35.4	29.3	
9.1	25 55.3	46.8	B
9.3	26 15.0	59.1	
9.5	15.1	51.8	
9.5	18.2	3.2	
9.4	31.1	56.6	
8.5	36.8	26.2	
6.5	43.7	15.8	
9.5	48.6	20.0	
9.4	57.0	43.9	
9.1	27 18.0	33.5	
9.1	20.0	58.8	
9.5	28 20.9	10.3	
9.1	54.6	19.4	
9.5	56.0	20.4	
9.1	29 11.2	28.3	
9.5	17.5	51.8	
9.4	17.5	48.9	
9.5	25.3	48.6	
9.4	26.4	22.4	
8.0	28.7	43.1	K
9.5	50.6	52.2	
9.5	57.0	49.2	
7.8	30 18.4	55.3	K
8.1	28.4	15.2	B
9.2	36.5	10.4	
9.0	58.6	35.2	
8.4	31 3.6	19.3	K
8.4	3.9	13.1	

4463—4493			
	23h	+44°	
m	′ ″	′	
9.2	32 5.7	46.7	
7.5	15.9	55.0	B
9.5	33.4	2.8	
7.8	45.7	38.5	B
7.0	33 7.1	16.5	L
9.3	51.2	15.5	
9.4	34 9.7	59.5	
9.5	36.1	33.5	
9.5	41.0	7.6	
9.5	52.6	27.7	B
6.5	35 7.8	11.2	K
8.8	39.4	23.1	
8.4	46.9	5.0	
9.5	52.2	46.2	
8.8	36 21.2	14.8	K
9.1	44.5	6.0	
9.5	47.9	47.3	
9.5	37 18.0	9.2	
9.5	37.8	27.6	
9.5	50.8	56.9	
9.0	58.0	0.0	
9.3	38 4.1	58.3	
9.5	28.3	12.0	
9.0	39 18.7	51.2	
9.3	24.3	5.1	
9.4	24.4	7.6	
9.5	52.9	31.5	
9.5	40 2.0	11.6	
9.0	10.3	8.6	
9.4	18.9	32.8	
9.1	34.5	47.6	

4494—4524			
	23h	+44°	
m	′ ″	′	
9.5	40 59.6	24.0	
8.4	41 10.7	37.7	K
9.1	18.1	54.5	B
9.5	32.8	26.5	
9.5	48.0	23.0	
9.5	42 30.0	46.5	
9.5	54.5	49.0	
9.5	43 4.9	8.6	
9.5	13.8	6.5	
9.3	54.0	17.9	
9.4	44 3.5	29.0	
9.3	4.3	4.1	
9.4	15.8	54.2	
9.3	22.6	52.4	B
9.5	26.1	50.4	
9.2	45 21.9	10.1	
8.7	34.2	13.4	K
8.6	51.5	4.2	
9.0	52.3	13.8	
7.4	46 5.4	28.6	L
9.1	13.9	18.2	
7.8	52.1	4.0	K
8.9	54.6	32.1	
9.5	47 4.6	29.1	
9.0	27.1	4.9	B
8.8	32.5	57.5	B
8.5	39.6	35.2	K
9.3	54.8	0.9	
9.5	48 24.0	38.0	
9.4	30.4	17.9	
9.1	51.5	11.2	

4525—4555			
	23h	+44°	
m	′ ″	′	
9.4	49 5.4	4.4	
9.5	31.1	30.5	
9.5	32.3	25.6	
8.2	56.3	6.8	L
9.4	50 15.0	50.5	
9.1	51 13.6	6.1	B
9.3	24.3	52.7	
8.7	25.5	5.5	L
9.4	32.9	43.4	
9.5	48.7	14.8	
9.4	52 3.6	37.3	B
9.3	17.7	10.1	
9.2	57.3	12.4	
6.0	53 21.2	26.6	K
9.5	54 32.1	11.3	
9.0	34.5	59.6	
9.5	56.7	39.0	
9.3	55 9.7	7.2	
8.4	44.9	19.0	
9.5	56 6.5	25.2	
9.1	8.3	59.6	
9.1	57 2.0	9.7	
8.9	9.4	8.0	
9.5	32.7	57.0	
7.2	33.6	52.5	L
6.3	44.6	25.2	G
9.1	59.2	32.5	
9.4	58 41.7	29.7	
8.8	59.0	57.8	
9.3	59 27.2	27.6	
9.5	53.3	57.8	

Zone +45°

1—40				41—80				81—120				121—160				161—200			
	0h		+45°		0h		+45°		0h		+45°		0h		+45°		0h		+45°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.3	0	1.3	49.0	8.6	7	42.0	47.8	B	9.3	16	14.7	41.5		9.5	22	49.6	5.7		9.5	29	49.0	29.5	
9.3		20.9	4.9	9.4		57.2	43.8		9.0		20.5	29.3		8.5	23	1.1	47.2	L	9.5	30	23.1	14.2	
8.8		45.8	14.6	9.4	8	8.5	5.4		7.9		31.1	4.8	A	9.4		51.4	52.0		9.0		43.0	21.8	
7.5		45.9	54.1	A	9.1		22.6	37.9		9.3		59.4	30.2		7.6		57.2	7.3	A	8.9		45.7	28.6	
9.5		58.8	55.9		8.7		24.6	21.9	A	8.8	17	12.5	14.0	A	9.4	24	2.5	33.6		8.9		53.8	28.6	
9.2	1	5.8	16.0		9.0		27.2	59.0	A	9.0		13.0	37.2		9.4		7.2	53.9		9.5	31	17.1	50.8	
9.0		7.1	19.0		9.0	9	7.1	35.2		9.3		28.3	35.8		8.8		9.3	47.1	L	9.2		27.6	5.6	
9.5		29.3	0.3		7.5		16.1	49.1	A	9.5		45.3	52.9		9.2		10.0	41.0		8.7		31.0	16.7	
9.2		39.6	39.5		9.5		51.4	6.4		9.5		50.0	15.7		9.3		23.2	20.6		9.1		41.2	55.2	
9.3		52.2	25.0		9.5		55.6	43.6		9.5	18	1.8	5.8		9.3		26.0	16.2		9.5		45.3	31.2	
7.0		58.4	34.9	A	9.5	10	19.0	18.6	B	9.3		5.3	29.5		9.5		34.8	25.9		9.3		47.8	45.8	A
8.9	2	2.3	11.6		7.0		30.7	24.1	A	9.5		49.6	23.8		9.5		45.4	54.8		8.5		56.6	45.7	A
9.5		18.7	42.5		9.5		35.1	37.8		9.4		50.3	16.4		9.4		58.8	38.3		9.5	32	6.7	29.8	
9.4		22.5	13.8		9.1		46.6	33.9	A	9.4		50.8	10.1		8.5	25	4.6	58.5	A	8.1		29.5	28.0	A
9.2		29.7	55.3		8.9		59.1	34.3	A	8.8	19	10.0	9.4	B	8.5		7.9	53.8	A	9.5	33	2.4	26.1	
7.7		34.3	34.6	A	9.5	11	25.2	54.0		9.1		26.9	49.3		9.5		13.6	38.0		9.2		15.0	4.8	K
5.2		48.8	16.3	A	9.2		31.6	21.4	A	9.4		28.0	8.5		9.5		15.8	32.4		9.4		30.1	8.0	
9.5	3	13.9	53.4		9.3	12	3.1	42.7		9.0		28.8	50.8		9.5		21.8	32.4		9.4		58.8	11.7	
9.1		29.4	24.0		9.4		5.0	50.9	B	9.4		34.3	7.2		9.5		24.0	9.3		9.5	34	14.1	51.2	
9.2	4	13.5	30.2	A	9.5		5.3	5.8	B	8.5		36.6	45.1	B	9.4		33.2	35.4	B	9.5		29.0	52.7	
9.4		21.2	43.7		9.4		10.4	54.9		9.3		41.5	19.4	B	9.0		38.0	32.1	A	7.0		51.2	7.9	A
9.5		23.6	36.0		9.1	13	1.2	44.6	L	9.5		45.7	85.6		9.3		51.8	20.8		9.2	35	16.9	27.1	
8.7		37.6	57.8	A	9.3		6.0	48.5		9.2		47.4	28.8		9.3	26	16.6	59.9		9.3		25.7	8.1	
8.0		53.8	8.5	G	8.2		15.9	40.8	A	9.2		52.5	51.2		9.5		21.7	25.0		9.4		28.0	49.5	
9.5		57.7	12.8		9.1		18.3	43.2	A	9.4		58.9	5.0		9.5		23.5	54.9		9.5		53.9	59.3	
7.0	5	14.1	17.9	G	9.5		20.1	7.0	B	8.8	20	1.5	45.3		9.5		49.0	21.7		9.2	36	2.5	56.0	
8.8		33.9	69.7	A	9.4		41.8	53.1		9.5		19.3	1.2		8.9	27	1.9	38.8	A	7.2		9.0	26.6	A
9.5		47.8	48.5		9.5		48.1	23.7		9.5		29.2	57.3		9.5		22.0	38.8		8.8		22.1	7.4	A
8.5		48.1	27.1		8.3		52.1	30.9	A	9.5		40.0	17.2		9.5		48.6	52.4	B	9.5		44.7	33.4	
9.5		48.1	37.5		9.5	14	16.2	34.1		9.5		54.6	40.2		9.4	28	3.4	47.1		7.8	37	19.6	30.5	A
9.5		53.0	34.3		9.5		20.8	24.9		9.5		58.1	17.5		9.5		31.2	14.9		9.5		34.1	9.5	
9.2		54.5	36.6		9.5		24.3	32.0		9.5	21	16.0	30.1		9.5		37.9	34.1		8.6		49.2	6.0	K
9.2	6	19.6	59.6		9.5		44.4	25.1		9.5		25.9	44.4	B	9.5		43.0	25.2	B	9.1		56.3	16.6	
9.4		22.4	50.6		9.1	15	3.6	25.9	A	9.5		36.3	20.9		9.5		46.9	12.9		9.4	38	20.0	18.8	
9.3		24.8	46.8		9.4		28.1	7.7		9.5	22	0.6	48.8		9.5	29	24.1	3.4		9.5		27.0	56.9	
9.4		39.9	23.9		9.0		40.2	44.6		8.6		3.1	35.1	A	9.5		28.1	58.2		9.5		43.0	57.4	
9.5	7	1.1	1.7		9.3		41.9	22.3		9.2		5.3	17.6	A	9.5		29.8	27.8		9.5		45.2	23.0	
8.6		18.2	59.3	A	9.5		50.5	9.6		9.5		9.8	27.0		9.5		39.0	22.4		9.5		46.4	54.3	
9.3		30.7	44.7	B	9.5	16	1.6	20.2		8.5		22.2	9.1	A	8.7		39.3	41.2		7.5		49.9	33.9	A
9.2		36.9	58.8	A	8.9		4.4	46.7		9.5		36.0	49.2		9.5		40.8	51.0		9.4	39	9.8	5.7	

201—260				261—320				321—380				381—440				441—500			
	0ᵘ	+45°			0ᵘ—1ᵘ	+45°			1ᵘ	+45°			1ᵘ	+45°			1ᵘ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	39 9.8	23.7	A	8.8	54 34.9	45.0		9.4	12 18.5	10.1		9.4	26 10.6	8.0		9.5	37 37.8	24.9	
8.3	39.0	27.1	A	9.4	51.5	38.2		9.5	31.7	59.1		9.5	25.2	28.5		9.5	39.6	44.2	
9.5	55.2	41.0		9.4	51.8	14.9		9.5	41.8	16.7		8.8	34.7	4.8	A	9.4	43.4	7.8	
9.5	40 19.1	55.1		9.5	52.8	5.3		9.4	43.6	23.8		9.5	27 1.4	18.8		8.9	48.7	7.3	A
9.5	24.4	1.0		9.5	55.7	7.0		9.5	13 7.1	12.8		9.3	3.6	17.9		9.5	38 2.5	30.1	
9.5	43.4	44.4		9.0	57.9	9.6		9.5	10.4	27.5		9.5	11.9	57.5		9.0	30.6	6.1	A
9.4	41 0.9	36.2		9.2	58.4	45.4		9.5	11.9	3.8		9.0	24.4	36.6	B	6.9	54.7	30.4	A
8.7	13.7	0.8	A	8.7	55 4.9	46.0		9.5	18.8	59.8		8.9	30.0	11.4	A	9.5	39 28.9	16.3	
7.0	26.1	42.6	A	9.0	5.1	12.0	K	9.5	38.6	10.8		9.5	35.5	51.9		8.5	31.6	11.4	B
9.5	39.1	53.2		9.4	30.8	36.2		9.5	14 28.7	38.4		9.4	42.9	1.7		9.0	39.7	30.8	A
9.5	45.8	53.8		8.3	56.9	26.3		9.5	41.7	6.4		9.0	28 8.6	17.5	A	9.3	40 13.7	14.2	
9.5	42 1.3	59.9		9.4	58.4	29.4		9.5	49.2	57.6		7.6	31.8	43.1	A	9.2	16.8	1.1	
9.4	2.5	52.7		9.1	56 10.8	57.4		8.8	56.9	0.0	A	9.4	34.6	57.8		9.3	39.6	28.4	
9.4	47.6	14.8		9.0	56.7	22.2	A	9.5	15 1.2	20.0		8.9	42.9	12.9	A	9.3	40.0	34.1	
7.1	53.1	55.7	A	8.8	58.1	16.4	A	9.5	16 12.4	59.9		9.5	46.4	22.5		9.3	50.3	12.6	
9.5	43 0.7	43.7		9.1	57 22.1	20.3	A	9.5	38.0	31.7		8.3	29 18.3	15.7	A	9.5	41 17.6	58.1	
9.4	14.4	11.9	B	9.1	34.2	31.8	A	9.4	57.6	15.5		9.4	25.2	45.3		9.4	19.0	38.0	
9.5	33.9	51.8		8.5	35.6	21.1	A	9.5	17 20.0	20.9		8.2	39.4	40.9	A	8.8	19.9	35.1	A
9.5	45.5	43.7		9.5	59 8.7	22.3		9.4	37.5	0.5		9.3	48.0	36.8	B	8.4	49.0	40.3	A
9.4	51.3	47.8		9.2	56.3	58.0	A	9.5	18 11.2	14.0		9.3	51.3	44.9		9.4	42 20.1	19.0	
9.3	57.4	1.8		9.3	0 14.7	51.6		9.2	12.0	26.5		7.4	56.9	36.3	A	9.0	21.2	43.5	L
9.5	44 11.2	43.2		9.5	20.8	30.8		9.5	37.6	3.4		9.3	30 11.2	9.4		9.2	26.2	57.5	
8.2	17.7	0.8	G	7.8	36.6	10.1	B	9.5	47.2	42.2		8.8	39.9	5.5	G	9.0	45.0	57.9	
9.0	35.4	25.9		9.5	1 13.6	48.8		9.5	19 1.2	21.2		7.0	46.7	8.9	G	8.2	47.7	5.4	
9.1	43.0	16.4		9.4	17.2	40.1		9.1	5.0	47.1		9.0	50.8	17.8		8.0	48.4	36.9	A
9.4	45 9.8	23.4		9.4	20.6	17.5		9.5	35.8	15.9		9.5	51.4	25.7		9.4	43 24.1	57.2	
7.8	12.4	48.4	B	8.0	50.5	12.2	K	9.5	36.9	30.4		9.3	31 8.7	53.6		9.5	45.9	10.5	
8.2	29.2	1.6	K	9.5	2 2.0	43.5		9.5	44.3	21.3		9.5	22.1	21.4		9.3	44 20.2	44.1	A
9.4	46 31.7	3.0		9.4	12.3	2.0		9.2	45.9	54.5		9.4	28.6	58.8		9.5	33.7	45.9	
8.6	45.3	32.5		9.4	45.6	28.0	B	9.5	46.8	59.5		9.5	38.5	26.0		9.0	57.8	25.0	
9.5	47 19.7	23.5		6.9	48.6	24.9	A	9.3	20 4.5	40.5		9.1	46.7	6.6		9.5	45 16.0	40.4	
8.8	41.4	9.0		7.0	51.7	51.6	A	9.5	12.0	8.2		9.5	32 8.3	9.4		9.0	17.8	46.9	A
9.5	49.0	43.5		9.3	3 2.6	20.6	A	9.5	15.3	53.2		9.3	20.2	56.4		9.1	18.4	57.4	
7.6	48 2.5	52.4	A	8.7	23.9	10.0	A	9.5	35.9	6.6		9.5	31.1	38.0		9.4	32.3	29.7	
9.5	5.7	12.2		9.4	49.1	3.5		9.2	44.7	17.1	A	9.5	36.7	48.9		9.5	59.5	21.0	
9.5	7.4	49.1		9.5	4 23.2	4.7		9.3	53.1	54.9		8.3	40.0	40.2	A	9.3	46 4.5	17.7	A
6.1	49 28.5	3.4	A	9.3	28.6	25.0		9.3	56.6	56.5		9.3	47.7	56.0	B	8.7	4.9	28.5	A
9.5	30.1	9.0		9.5	57.3	10.5		9.5	21 7.2	38.4		9.5	33 0.6	48.2		9.4	11.5	18.4	
9.2	36.2	33.7		9.3	5 3.1	4.5		8.7	13.8	1.7	B	9.5	2.5	7.9		9.5	20.0	25.1	
9.4	44.9	33.5		9.3	7.1	29.4		9.2	19.3	6.4		9.2	16.5	13.0	A	8.4	29.9	24.8	A
9.5	47.4	55.9		8.0	13.0	53.2	A	9.2	37.7	9.5		9.5	31.5	46.9		9.2	54.0	39.6	
9.5	52.1	23.0		8.9	54.2	18.6	A	9.5	22 41.4	38.2		9.4	41.2	18.2	A	9.5	55.8	28.5	
9.4	55.2	18.7		8.0	6 34.5	51.7	A	9.5	23 2.7	43.5		9.5	50.5	29.9		9.5	47 26.1	50.7	B
9.3	50 13.5	52.1		9.2	7 17.6	40.3		9.3	4.4	48.1		9.1	34 21.7	12.5	A	8.0	30.0	15.8	A
9.5	31.6	20.8		9.5	29.7	37.9		8.3	12.9	39.4	A	9.5	35.0	50.2		9.3	33.5	6.1	B
9.5	47.5	3.9		9.5	54.6	30.4		9.5	32.5	13.5		9.2	46.9	35.8		9.4	36.5	51.9	
9.4	51 22.9	35.9	A	9.5	8 2.6	12.2		9.5	38.0	14.8		9.5	47.6	45.8		8.7	42.7	48.5	A
9.3	44.8	54.0		9.1	4.2	43.7		9.5	41.4	9.3		9.5	54.8	0.6		9.5	48 7.0	3.9	
9.4	52 10.8	9.2		9.3	37.7	16.2		9.5	24 6.6	40.1		9.3	35 0.9	15.0		9.2	23.0	55.3	
9.4	12.0	33.2		9.5	59.8	29.4		9.2	14.3	49.9		9.4	14.6	1.8		9.1	23.4	45.5	
9.4	26.1	13.8		9.5	9 4.8	8.3		9.2	25.4	48.7		9.5	18.5	39.8		8.8	26.1	36.8	A
9.0	33.3	22.7		9.2	35.6	42.2		9.3	29.3	22.3		6.8	37.4	24.7	A	9.5	28.8	7.0	
9.0	53 3.0	27.9		9.1	58.4	22.0		9.5	25 10.8	36.8		9.5	36 4.1	35.3		8.7	31.5	30.2	A
9.4	4.6	13.9		9.5	10 19.3	32.7		9.5	12.9	50.0	B	9.5	31.1	22.7		8.6	57.5	45.7	A
9.5	10.0	12.2		9.0	56.7	35.1	A	9.5	14.2	9.6		9.3	34.5	31.9		9.5	49 6.0	29.4	
9.5	23.1	45.8		9.5	11 15.1	15.1		8.5	20.0	13.9	A	9.5	37.8	59.9		9.3	12.4	56.6	
8.8	29.7	48.8	B	9.1	56.1	15.7	B	9.8	23.7	9.2	B	8.1	53.4	57.9	L	9.5	40.7	1.6	
9.5	45.0	5.2		9.4	12 9.9	29.1		9.5	44.5	45.8		9.5	37 8.6	31.8		9.5	43.9	7.2	
9.5	50.0	28.3		9.0	11.1	34.8	A	9.0	51.5	46.8	B	9.2	20.5	57.6		9.4	50.6	29.1	
9.5	54 5.7	56.3		8.7	12.1	34.6	A	8.5	54.9	19.0	A	9.5	37.7	29.1		9.5	50 9.9	38.9	

501—560				561—620				621—680				681—740				741—800			
	1ʰ—2ʰ	+45°			2ʰ	+45°			2ʰ	+45°			2ʰ—3ʰ	+45°			3ʰ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	50 19.9	9.5		9.2	1 59.8	31.4	A	8.4	22 30.3	31.5		8.0	47 34.1	25.8	B	7.7	10 31.7	38.2	A
9.5	20.0	38.2		9.2	2 11.7	32.8	A	9.5	23 8.2	58.8		9.2	43.3	55.9		9.5	55.8	59.4	
9.5	26.0	28.2		9.0	17.3	4.2		9.2	21.3	46.3	B	9.5	55.7	1.9		9.2	11 3.4	22.8	A
8.7	27.0	26.3	A	9.5	31.7	14.4		9.1	24 4.6	0.7	B	9.0	48 6.7	21.7		9.0	30.5	4.8	
9.0	37.6	46.8	A	9.4	37.0	4.6		9.4	51.7	39.0		9.5	38.2	41.0		9.4	35.7	18.0	
9.5	43.3	52.7		9.5	3 2.6	2.1		9.2	25 1.2	40.9		9.1	51.8	48.4		9.0	40.9	12.0	A
9.4	45.6	49.5		9.5	52.6	45.2		8.2	23.7	17.3	A	9.3	49 2.6	1.1	A	9.5	54.5	51.3	
9.2	51 25.8	57.3	B	9.1	4 10.7	21.5		9.2	59.2	18.8	A	9.5	50 9.3	44.4		9.1	12 53.1	1.9	
9.5	42.9	55.9		9.5	13.6	25.0		9.5	26 50.3	42.1		9.5	39.2	59.6		9.0	13 14.7	22.8	
9.4	43.0	33.7		8.6	31.0	2.0	K	9.4	54.5	57.5		9.4	51 30.2	3.1		9.0	20.2	25 8	
9.4	46.5	57.1	B	9.0	31.9	17.6		9.4	27 7.0	21.6		8.5	33.1	13.4	K	8.5	42.8	1.4	A
9.2	52 6.9	59.8		9.5	44.4	51.5		9.5	15.7	23.6		9.0	53.8	15.7	B	8.4	14 0.9	0.3	A
9.5	29.9	48.3		9.0	54.8	26.2	B	9.4	19.9	4.1		9.5	55.2	21.8		9.3	5.2	36.9	B
9.5	53 12.2	30.5		9.4	5 21.3	26.6		9.4	24.1	49.7		9.5	52 28.7	21.8		9.0	7.7	46.0	
9.0	15.4	40.6	A	9.1	6 0.8	58.1	A	9.5	36.0	8.8		9.2	53 27.6	17.4		9.4	27.3	4.8	A
9.0	19.5	58.3	A	9.5	24.0	8.9		9.3	37.7	0.6		9.5	55.9	7.6		9.4	15 1.8	42.5	
9.2	26.0	4.7	K	9.5	54.0	10.8		9.0	54.7	42.4		9.5	54 5.2	31.1		9.5	9.1	0.8	
9.1	29.1	38.9	A	8.2	56.5	59.6	A	9.0	28 15.8	27.1		9.5	12.7	1.1		9.1	19.9	0.7	A
9.0	50.7	2.0	A	9.5	58.0	7.0		9.4	20.3	54.3		9.5	38.3	56.7		9.5	26.0	14.5	
9.4	57.2	42.5		9.5	7 6.0	7.0		9.0	41.7	56.1	A	8.9	55 4.2	43.8		9.5	26.3	51.4	
7.8	59.6	39.4	A	9.1	7.4	12.6		8.2	45.2	27.1	A	9.2	18.8	52.1	B	9.5	41.7	39.2	
9.3	54 1.8	52.4		9.2	32.9	8.9	A	9.2	47.3	44.8		9.5	26.8	51.3		9.5	54.9	9.6	
8.3	6.0	4.8	A	7.7	54.6	9.6	A	9.5	29 10.7	14.3		9.5	52.2	15.8		9.1	16 5.1	20.4	
9.5	14.6	55.7		9.5	59.0	14.8		9.5	33.8	49.7		9.5	56 16.8	2.8		9.2	5.2	5.0	A
9.5	27.6	47.9		9.2	8 28.8	1.5	A	9.5	36.0	5.1		9.4	19.2	6.7		9.5	27.7	28.7	
9.2	31.1	57.9		9.5	31.2	43.3	A	7.8	39.2	34.5	A	8.0	26.2	12.1	L	9.4	17 2.0	13.4	
9.4	55 8.0	54.4		9.3	9 24.6	10.5		9.0	30 27.9	8.1	A	9.4	34.2	53.8		9.5	12.4	4.4	
9.2	19.4	7.7	A	9.2	32.1	0.5	A	9.5	31.3	31.5		9.4	43.1	54.3		9.5	42.4	32.1	
8.8	23.7	38.9	B	6.3	53.7	48.2	L	9.2	45.5	17.8		9.1	54.1	34.4		9.5	52.7	43.5	
9.5	35.8	33.9		9.2	10 22.9	42.1		8.8	31 4.7	11.9	A	7.8	57 1.2	11.4	K	9.2	55.8	21.5	A
9.1	36.2	16.5	A	9.5	32.5	9.6		8.9	32 18.6	1.2	A	8.8	58 44.7	41.5	A	9.4	18 26.7	4.4	
8.4	54.0	52.5	A	9.1	37.0	42.6		9.5	41.7	47.3		9.5	45.8	12.9		9.5	20 2.3	32.7	
9.5	56.1	3.1		9.1	42.4	38.3		8.7	44.9	1.7	A	9.2	59 31.9	5.2	A	8.5	17.8	57.9	
9.5	56 22.1	5.4		9.3	48.0	52.7		9.3	33 5.2	45.1	A	9.4	0 8.9	29.7		9.5	30.4	29.8	
9.4	41.1	3.2		9.5	48.2	37.9		9.5	26.5	2.4		9.5	26.4	16.3		9.5	21 10.9	1.2	
9.5	47.9	3.1		9.4	11 7.4	41.4		8.9	34 38.1	58.1		7.5	31.7	21.7	A	9.5	31.2	33.2	
9.5	59.8	3.4		9.5	16.6	0.5		9.5	35 13.3	21.2		9.3	44.8	43.6		9.5	59.7	56.9	
9.5	57 2.0	18.1		9.0	55.2	19.7	A	9.2	36 26.7	42.3		9.5	46.7	41.8		6.0	22 26.0	33.6	G
9.5	58 0.6	53.2		9.1	58.8	58.4		9.1	37 33.2	26.6		9.3	1 13.6	58.8		9.0	40.0	4.1	B
9.4	5.2	3.6		7.8	12 11.0	44.6	A	8.8	36.7	17.8		8.7	29.7	41.5	A	9.4	40.4	3.6	
9.5	15.3	14.2		9.5	22.8	2.3		9.5	38 25.7	23.6		8.6	53.6	10.8	A	9.3	23 2.3	11.6	B
9.5	16.7	57.3		9.4	58.0	37.5		8.3	39 56.4	47.7	B	7.0	2 7.6	33.6	A	9.5	4.7	27.3	
8.3	17.0	13.1	K	9.5	13 16.2	36.0		9.4	40 27.6	49.3		9.3	13.1	28.3	B	9.4	8.7	33.7	
8.7	25.4	5.9	K	9.1	36.2	13.9	K	9.5	29.2	21.2		7.3	20.2	50.3	L	8.5	8.9	45.1	
8.7	25.7	59.9		7.8	57.3	30.1	A	8.6	41 2.7	12.8	A	9.1	35.3	47.2	B	9.5	29.2	39.2	
9.2	32.7	13.2		9.5	15 10.7	53.1		9.5	9.1	1.7		8.8	39.2	33.1	A	9.1	31.3	20.5	
8.8	49.5	8.3	K	9.2	44.5	50.2		8.1	11.4	28.1	B	8.5	49.7	40.9	A	9.0	31.5	14.5	K
9.4	53.1	6.8		8.2	16 6.2	15.8	A	9.3	55.5	1.6		8.5	3 18.8	36.1	A	9.4	24 17.2	46.5	
9.2	59 1.6	19.9		8.7	51.8	53.7		9.0	55.7	21.7		8.8	4 20.9	2.2	K	9.2	29.7	19.0	
9.2	3.9	40.9		9.0	17 12.7	39.5		9.4	42 19.9	5.8		9.0	22.5	20.9		9.5	32.7	14.0	
9.5	10.3	9.8		9.2	45.7	40.5		9.5	38.8	22.2		9.5	6 34.8	9.2		9.2	25 19.8	8.9	
9.5	11.7	54.9		9.0	18 2.1	55.4		9.5	49.0	32.8		9.5	55.7	43.5		9.5	38.3	15.5	
9.5	37.2	5.4		9.5	21.8	14.8		9.5	43 23.8	51.0		9.0	7 13.2	34.7		9.0	28 0.8	47.5	
7.4	0 4.3	8.9	K	6.5	20 21.2	22.1	A	9.5	44 2.3	21.8		9.4	8 17.8	1.7		9.4	29 34.7	34.8	B
9.0	34.4	37.9		9.5	55.7	30.1	A	9.4	10.1	0.5		9.3	22.4	8.3		7.5	30 35.6	32.2	L
9.3	1 2.2	55.8		9.5	21 17.5	9.0		9.2	47.2	9.2		9.5	40.3	59.3		9.5	31 6.8	4.3	
8.2	28.6	14.2	L	9.5	18.5	11.3		9.2	45 33.7	17.4		9.2	54.5	55.9		9.3	7.4	2.1	
8.6	39.7	46.3	B	9.5	39.3	38.0		9.1	46 2.7	32.0		9.0	9 22.2	27.3		8.0	11.7	26.3	L
9.3	43.9	6.1		7.3	50.2	44.8	A	8.8	14.3	13.3	K	9.5	24.5	23.3		8.5	14.0	42.0	
9.5	44.7	55.5		7.2	22 26.2	56.8	A	9.4	47 24.6	2.9		7.4	10 26.3	20.6		9.5	32 7.7	51.8	

801—860				861—920				921—980				981—1040				1041—1100			
	3u	+45°			3u—4u	+45°			4u	+45°			4u	+45°			4u—5u	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	32 11.2	34.2	A	9.4	52 9.3	35.2		7.9	11 33.0	6.4	A	9.0	35 16.2	28.7	A	9.5	56 50.0	39.4	
9.5	33 6.7	32.2		9.0	11.7	52.3		9.0	42.9	11.4	B	9.3	36 26.9	46.6		8.6	57.4	3.4	B
9.4	15.0	50.9		9.4	30.8	34.2		9.5	51.9	40.3		9.5	38.4	43.0		9.5	57 9.0	2.2	
6.5	34 33.6	39.2	A	9.5	54 4.2	34.2		9.5	58.8	9.3	B	7.3	37 1.4	43.7	B	9.4	15.3	32.7	
8.3	38.0	34.2	A	9.4	56.3	59.2		9.5	12 16.3	3.5		9.0	9.3	1.8	A	9.4	17.9	47.6	
9.5	49.9	52.8		9.4	59.3	11.3		9.2	33.5	46.0	B	9.2	18.7	4.1		9.5	59.0	9.3	
9.1	52.3	26.8	A	9.4	55 3.1	2.0		9.3	56.9	50.1		7.0	23.4	13.0	A	9.5	58 2.0	15.8	
8.0	35 47.7	7.6	A	8.6	25.2	12.8	K	9.0	13 30.1	27.5	A	9.5	33.9	55.3		9.5	14.9	38.2	
9.1	51.0	51.9		9.5	43.3	47.5		9.4	42.7	5.0		9.5	57.7	34.4		9.2	53.6	25.1	
9.4	51.2	19.5		9.2	56 3.7	15.0		9.5	14 49.6	30.4		9.5	40 11.4	52.3		9.5	59 8.1	39.4	
6.2	51.9	14.0	A	9.5	24.5	22.3		7.5	15 2.9	49.0	A	9.4	35.4	26.8	A	9.1	14.0	33.1	
9.5	36 18.7	29.3		9.5	44.3	11.2		9.3	8.3	41.7		6.5	41 4.2	36.1	B	9.1	14.2	47.8	
9.5	19.7	49.1		9.4	52.1	51.6		8.4	22.9	53.0	A	9.5	25.6	59.9		9.5	30.4	58.2	
9.5	40.5	51.9		9.5	52.1	57.5		9.5	36.4	2.6		9.5	46.9	19.6		8.8	46.7	16.5	B
9.0	37 45.2	21.0	A	9.2	57 9.2	37.2		9.5	16 47.5	23.0		6.6	47.7	40.7	A	9.4	53.2	26.5	
9.5	38 54.2	12.5		8.3	49.4	11.5	A	8.4	17 13.4	55.6	S	9.5	42 51.9	41.1		9.5	55.1	52.5	
9.5	39 29.3	48.5		8.7	58.7	52.3	A	9.0	57.3	3.1		9.5	43 42.4	49.0		9.3	56.5	23.7	
9.5	36.2	45.0		8.6	58 4.3	58.9	A	9.5	18 47.6	31.9		8.8	42.5	36.6		9.5	0 22.3	43.2	
9.4	45.1	29.3		9.4	28.2	46.5		9.3	19 31.5	53.1		7.9	59.7	26.1	B	9.3	46.0	55.2	
9.5	40 14.5	14.0		9.5	30.4	5.8		7.8	40.1	37.4	A	8.0	44 11.2	27.8	B	9.4	50.6	25.8	
9.4	24.2	2.6	B	7.3	34.9	50.5	A	7.5	59.6	49.6	A	8.6	56.5	2.0	L	9.5	51.0	41.2	
9.0	25.2	48.5		9.5	38.7	52.6		9.3	20 3.5	58.9	A	9.5	45 5.1	51.9		8.0	1 14.4	28.0	L
9.5	29.7	52.3		9.4	48.0	56.8	B	8.5	20.4	41.8	A	9.5	10.4	45.0		8.8	36.7	23.6	
9.0	35.8	9.3	K	9.5	52.3	40.7		9.3	21.1	31.4	A	9.2	35.6	46.0	B	8.3	38.3	34.1	
9.5	53.0	59.5		9.5	59 18.8	4.7		9.0	21 18.3	20.1	A	9.5	46 15.6	52.4	A	9.3	45.5	43.2	R
8.8	55.6	49.4		9.1	0 15.5	7.1	L	9.5	50.6	40.2		9.3	56.3	9.8	K	9.4	51.0	56.5	
9.1	41 27.9	9.8		7.4	51.4	1.7	K	8.8	51.6	17.2	A	9.5	47 4.8	0.8		8.7	2 21.1	30.7	
8.1	29.3	0.6	B	9.4	1 25.9	34.4	B	9.1	56.0	55.3		9.5	17.9	38.6		9.3	28.3	35.2	
9.5	42 3.8	50.9		9.4	26.1	35.3		9.5	22 1.8	0.3		9.4	21.9	35.8	A	9.3	31.4	6.6	A
9.5	8.3	17.5		8.4	35.3	41.3	B	9.3	14.6	3.9	B	9.5	33.8	51.0		8.9	3 0.0	22.8	
9.3	14.5	2.3		9.5	2 50.9	25.0		8.8	40.6	52.5		9.5	48 11.7	5.8		9.0	11.6	1.3	K
9.3	43.2	39.2		9.5	3 26.5	22.0		9.5	54.1	23.0		9.5	14.8	53.0		9.5	26.7	12.3	
8.0	50.7	31.3		9.1	47.4	39.2	A	9.2	23 2.5	14.7		9.5	46.3	0.0		9.5	35.1	9.8	
8.3	43 28.6	19.5		9.0	4 4.2	51.0	A	9.5	16.1	37.7	B	9.5	56.9	32.7		9.5	4 19.9	14.1	
9.4	46.1	10.2		8.7	38.9	39.7	A	7.0	37.1	20.1	L	9.5	49 26.8	22.3		9.0	27.8	53.2	A
7.8	51.2	4.5	K	8.0	55.9	55.6	A	7.0	46.5	36.9	L	8.9	52.2	12.7		8.5	5 49.3	58.4	A
9.4	56.5	11.6	B	9.5	5 17.4	26.0		9.5	24 9.7	14.7		8.4	50 1.2	1.7	A	1.0	58.6	50.6	A
9.3	44 6.4	20.5		8.1	24.8	1.9	A	9.3	26.5	6.5		9.3	27.4	21.4		9.5	6 16.7	23.2	
9.5	17.2	41.2		7.5	45.3	45.7	A	9.5	40.3	42.2		8.9	30.9	37.2	A	8.8	30.2	39.2	A
8.3	17.2	20.5		9.5	6 10.6	17.1		9.5	25 3.9	9.3		9.5	34.0	50.9		9.0	43.2	58.0	A
9.1	45 17.1	52.6		9.5	15.0	52.7		9.5	10.6	13.2		9.5	36.0	49.2		8.4	45.2	13.4	K
9.4	18.6	3.5		9.2	21.1	16.3	B	9.5	46.1	9.1		9.5	39.7	44.3		9.5	55.9	36.2	
9.5	27.2	54.3		9.5	47.2	39.3		9.5	48.0	44.1		7.5	43.9	12.9	A	9.5	7 1.0	51.2	
9.2	52.1	3.3	K	8.5	52.9	51.0	A	9.2	52.5	46.9	B	7.0	46.5	41.6	A	7.8	6.8	57.6	A
9.1	46 24.4	55.5	A	7.0	55.5	50.4	A	9.5	55.7	37.1		9.5	51 27.0	50.5		9.5	14.7	35.0	
9.2	31.3	26.9		8.5	7 41.9	15.1	K	9.4	26 32.3	2.0		9.5	43.1	3.0		9.5	36.5	38.7	
9.5	54.7	44.0		9.5	55.4	54.5	A	9.5	50.1	31.0		9.5	52 28.9	37.6		9.5	51.3	18.7	
9.5	57.8	39.2		9.5	8 30.2	44.7		9.3	58.6	4.8		9.2	53 0.8	44.6	A	9.5	53.2	34.7	
9.5	47 4.0	32.7		9.4	34.0	5.1		6.5	27 34.0	56.0	A	9.5	15.9	28.8		9.5	8 16.0	46.3	
9.5	36.9	2.5		9.4	40.0	40.3		9.5	28 56.4	53.0		9.0	18.5	51.4	A	8.1	19.9	5.3	S
9.3	53.2	22.3	A	9.3	9 2.9	16.1	A	9.0	29 5.6	20.1		9.5	25.2	35.7	A	8.8	33.5	3.9	
9.5	48 22.5	39.7		9.4	10.0	34.7		9.5	31 13.0	33.4		6.8	41.4	34.2	A	9.5	9 9.1	43.8	
9.0	27.6	26.3	A	9.4	17.4	20.0		8.5	32 31.8	20.4		8.9	54 45.3	7.6	A	9.5	16.5	58.5	
9.3	35.6	4.6		9.2	22.9	49.5	A	9.4	34.9	21.4		9.5	55 8.8	3.3		8.7	41.3	16.4	A
9.4	37.3	51.4	R	9.4	34.0	5.0		9.5	51.3	36.6		9.3	37.0	15.9		9.4	48.5	4.5	
9.0	49 13.2	5.1	K	9.5	55.4	20.0		9.5	56.8	5.3		9.3	40.2	51.0	A	9.4	10 11.6	48.1	
9.5	32.8	55.6	B	9.0	10 3.4	5.2	A	9.3	33 8.2	18.2		9.5	41.9	44.5		9.4	14.7	3.6	
8.5	42.7	17.0	A	9.0	4.2	38.5	A	9.2	10.9	50.2		9.5	50.4	34.0		9.4	15.1	38.7	
9.5	51 54.7	28.8		9.5	30.3	29.4		9.3	36.7	15.7	B	9.5	56 28.7	28.9		8.7	19.0	6.6	A
8.4	55.2	18.5		9.5	11 17.4	39.9		9.5	34 16.7	6.8		9.1	34.3	9.0		9.4	24.0	40.7	

1101—1160			
	5ᵘ	+45°	
m	′ ″	′	
9.5	10 50.0	23.1	
9.0	51.3	58.0	
9.5	11 0.1	59.4	
9.3	25.2	12.4	K
9.5	34.4	24.1	
9.3	42.5	40.8	A
9.5	12 23.0	6.2	
8.9	29.1	29.3	A
9.0	13 6.5	56.2	A
9.0	7.2	5.8	K
9.5	45.4	21.5	
9.5	50.0	29.2	
9.0	55.1	18.3	
9.5	14 8.0	59.0	
8.3	41.5	5.4	
9.3	52.3	32.3	
9.3	59.4	31.6	
9.0	15 32.2	39.9	
9.5	16 2.5	27.1	
9.5	10.0	58.0	
8.8	12.7	27.4	
9.5	17 4.5	27.7	
9.5	30.8	45.0	
9.3	18 21.5	56.6	
9.5	24.7	5.9	
7.5	19 28.7	41.1	A
9.0	45.7	48.3	A
9.5	58.8	17.0	
8.9	20 53.6	22.4	
9.5	21 14.9	46.3	
7.5	22 0.2	26.3	
7.5	2.8	22.8	
8.3	32.5	37.1	
8.2	36.6	7.0	A
9.0	55.3	17.8	
8.9	23 22.2	17.4	B
8.8	32.9	8.9	
9.5	41.8	58.2	
9.5	45.9	9.3	
9.5	52.7	48.3	
9.5	24 27.8	57.6	
9.4	47.5	59.8	
9.0	53.4	7.6	B
8.0	25 2.3	23.3	A
8.0	40.8	34.1	A
9.2	26 50.0	12.8	
9.0	27 36.9	40.0	
9.5	28 1.3	31.2	
9.2	5.2	58.1	A
7.5	21.2	20.8	A
9.5	34.2	31.6	
9.5	29 11.8	48.9	
9.3	33.4	55.6	
9.5	34.1	7.1	
9.5	49.6	51.7	
7.9	58.3	37.3	B
9.5	30 57.0	27.8	
9.2	31 10.3	48.6	B
9.4	22.1	2.8	
9.3	22.1	58.6	

1161—1220			
	5ᵘ	+45°	
m	′ ″	′	
9.1	31 56.3	26.2	
9.5	33 0.6	4.2	
8.5	9.9	8.1	A
9.5	21.8	46.5	
9.2	32.3	29.2	
9.4	59.8	31.2	
9.5	34 36.3	7.6	
9.5	55.6	30.7	
9.0	35 51.0	11.6	
8.0	36 20.2	42.1	A
8.8	22.1	19.3	
8.9	31.4	59.9	A
9.5	31.9	31.6	
9.4	54.6	0.6	
9.4	37 25.4	25.0	
9.5	25.6	16.3	
9.5	28.1	10.0	
8.0	38 5.7	10.9	A
8.8	38.3	16.5	A
9.0	59.4	37.5	
7.9	39 29.3	2.3	A
9.5	35.5	5.9	
8.5	41 2.2	15.0	A
8.9	46.3	12.0	
9.2	47.3	14.9	A
9.1	42 24.7	21.1	B
8.9	25.4	21.9	B
9.5	25.8	41.0	
9.4	40.9	16.4	
9.0	59.7	6.3	
8.5	43 6.3	44.0	
9.5	46.8	58.7	
9.4	44 3.2	20.8	
8.5	6.9	18.0	A
9.0	45 13.8	58.0	
9.3	22.2	13.0	
8.8	22.3	8.9	A
9.4	30.5	31.7	
9.1	40.3	53.0	
9.4	53.2	27.2	
9.2	46 12.3	4.1	
8.5	23.0	28.2	A
9.2	34.1	7.5	B
9.3	41.2	7.4	
7.1	52.6	52.0	A
9.5	55.0	3.6	
9.3	47 5.3	37.6	A
9.3	15.2	30.3	
8.4	18.3	5.3	K
9.3	25.2	32.6	B
8.7	48 11.2	7.9	A
7.8	15.0	49.3	A
9.3	20.7	56.0	
9.3	31.0	12.1	
9.0	39.7	57.6	
7.2	41.6	35.9	B
4.8	49 11.2	54.7	A
8.7	27.7	29.2	
9.4	28.0	6.1	
9.4	28.6	33.0	

1221—1280			
	5ᵘ—6ᵘ	+45°	
m	′ ″	′	
8.8	49 46.2	32.0	B
9.4	50 8.5	33.1	
9.5	10.3	41.0	
8.7	19.1	8.9	
7.7	38.7	8.9	
8.7	51 23.1	8.6	
8.2	25.8	40.8	B
8.8	39.3	33.7	A
9.0	52 8.5	42.5	A
9.0	18.0	1.5	
9.5	49.7	11.2	
9.3	53 30.8	11.0	
9.5	40.1	4.2	
9.4	43.2	5.0	B
7.0	49.0	34.1	A
8.8	51.0	44.0	A
8.0	54 22.7	28.7	A
9.5	34.9	54.6	
8.5	39.1	50.5	
9.5	55 17.3	53.2	
9.0	30.4	50.8	
9.5	50.9	9.6	
9.3	56 16.8	51.8	
9.4	30.2	1.0	
9.5	57 5.2	19.3	
9.5	6.5	47.3	
8.4	30.3	3.9	A
7.0	37.0	33.2	A
8.8	58 1.2	39.1	A
8.9	12.8	49.9	A
9.4	59 10.4	34.1	
9.3	20.9	14.2	
9.5	54.3	51.7	
9.5	0 36.1	10.1	
8.6	1.9	1.3	A
9.3	7.7	46.8	
7.9	10.8	3.3	A
9.5	18.5	17.8	
7.9	36.9	4.6	A
9.5	2 6.0	5.9	
9.6	13.7	45.8	
9.5	30.2	18.5	
9.4	35.4	8.6	
8.0	42.1	4.5	A
9.3	3 53.0	3.4	
9.6	4 7.5	58.7	
9.5	19.0	7.7	
9.5	19.6	3.6	
9.5	39.5	10.5	
8.0	52.0	38.0	A
9.4	57.8	10.1	
9.0	5 0.7	32.6	
8.5	31.5	40.1	A
9.4	34.8	5.8	
9.1	37.6	14.3	
9.4	6 5.5	18.7	
8.8	8.3	6.2	
8.3	12.5	40.8	A
8.9	27.8	22.0	B
9.4	29.7	20.2	

1281—1340			
	6ᵘ	+45°	
m	′ ″	′	
7.2	6 38.7	53.3	A
9.5	52.3	37.1	
9.1	53.5	17.3	
8.4	7 9.4	31.2	
9.5	8 43.4	40.8	
9.5	48.1	35.1	B
9.5	9 19.5	47.3	
8.2	10 42.3	9.5	K
7.0	11 3.4	40.9	A
9.2	14.5	14.7	
9.5	25.8	50.0	
9.5	12 13.7	39.9	
9.4	43.6	54.2	A
8.8	13 24.9	56.5	A
9.5	49.6	55.8	
8.0	52.5	15.4	A
9.5	14 22.9	51.5	
9.5	30.0	22.6	
9.5	48.8	45.5	
9.5	56.5	31.4	
9.3	15 28.1	13.4	
9.3	17 22.0	35.0	A
9.3	32.9	16.7	
9.5	18 26.4	59.5	
9.3	35.1	12.0	
8.8	35.9	50.1	
9.5	43.8	30.0	
9.5	19 13.2	39.3	
9.1	55.3	0.1	
9.3	20 28.1	18.4	
9.1	48.0	55.6	B
9.1	49.0	50.2	A
9.0	21 8.0	48.7	A
9.1	22 21.5	1.5	
9.0	42.2	1.7	A
9.2	47.4	4.5	B
9.2	23 2.6	56.6	A
9.5	32.8	30.5	
9.3	38.4	10.8	
9.5	48.7	7.9	
9.6	24 30.0	49.6	
9.2	31.2	25.5	
9.3	48.0	20.6	
8.7	54.0	44.2	L
9.5	25 7.1	40.8	
9.5	40.3	20.6	
9.5	26 19.5	14.8	
8.7	27 6.0	17.2	A
9.5	10.1	5.8	
8.7	28 4.1	10.1	A
9.1	23.3	0.6	K
9.3	26.0	8.5	
9.3	50.4	54.5	
9.3	29 15.0	34.4	A
9.2	35.7	31.0	
9.3	39.3	29.1	
9.5	43.6	13.1	
8.6	30 58.6	55.9	A
9.5	31 14.0	29.0	
8.1	14.6	51.9	A

1341—1400			
	6ᵘ—7ᵘ	+45°	
m	′ ″	′	
9.5	31 28.0	0.8	
9.5	36.8	31.0	
9.5	32 17.2	31.0	
9.4	25.0	17.1	
9.4	25.5	9.1	
9.1	33 23.0	30.0	A
9.4	42.6	21.1	
9.2	35 14.0	54.3	
9.3	36 6.0	41.8	
9.3	16.7	10.9	B
9.3	17.2	31.0	
9.5	52.9	12.0	
9.5	37 41.8	56.4	
9.4	38 14.0	20.2	
9.5	49.0	30.0	
9.3	39 6.1	37.9	
8.8	13.3	52.1	A
9.4	40 11.8	15.2	
7.0	42 32.9	1.1	A
9.1	41.8	45.7	
9.3	43 36.7	35.3	
9.2	50.5	21.8	A
9.0	53.5	21.4	A
9.0	44 37.6	29.5	A
8.4	39.7	49.2	A
9.5	45 21.1	4.3	
6.0	47 2.0	18.6	A
9.5	48 8.3	15.7	
9.4	20.2	14.6	B
9.5	29.8	1.5	
9.5	30.5	50.2	
8.8	49 11.5	10.3	A
9.5	35.7	25.0	
9.2	51.3	2.1	A
9.5	50 3.5	38.0	
9.5	51 51.4	58.9	
9.5	52 9.7	0.5	
9.2	11.8	23.5	
9.0	57.1	6.3	K
9.1	57.9	37.8	B
8.9	53 1.5	45.8	A
9.2	7.4	31.8	
7.5	32.0	16.8	A
9.1	32.6	26.0	
9.4	42.5	57.0	
8.9	55 28.6	50.6	B
8.2	30.7	5.0	A
8.5	56 34.6	37.4	A
9.3	54.1	45.8	
9.2	58.4	39.4	A
9.8	57 33.6	45.7	A
9.3	55.4	24.6	
9.1	59 7.2	10.6	
7.5	0 18.5	28.7	L
9.2	1 6.7	11.5	K
8.8	7.0	16.4	
9.5	31.7	45.7	
9.0	58.0	21.6	A
9.0	2 50.0	48.2	A
9.3	52.1	42.1	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	7u	+45°			7u	+45°			7u—8u	+45°			8u	+45°			8u—9u	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	3 4.5	44.4		9.1	27 25.5	49.1		9.2	50 36.4	37.5		9.3	16 33.5	54.2		7.6	39 53.0	30.3	A
9.5	25.2	9.8		7.8	36.7	3.1	A	8.5	59.9	12.1		9.3	35.2	26.5		7.5	57.2	13.4	A
9.4	35.3	45.4		9.0	57.6	15.6	A	9.5	51 13.7	0.6		9.0	54.9	41.4		8.5	40 13.0	30.3	A
9.1	4 9.0	7.7	K	8.5	59.8	31.3		8.0	20.9	27.0	A	8.6	17 28.9	0.1	K	9.5	20.3	48.2	
9.5	9.3	2.6		9.5	28 22.8	51.2		9.5	25.7	27.1		9.5	48.7	25.5		9.4	44.6	35.7	
9.5	20.0	36.0		8.9	37.2	15.4		9.5	53 17.2	11.1		8.8	49.4	6.6		9.5	41 0.1	34.7	
9.5	44.8	9.4		8.6	29 3.7	9.4	A	9.5	54.4	35.5		9.1	18 3.9	45.9		9.1	52.5	34.2	
7.0	5 4.6	38.9	G	8.3	13.2	59.5		8.0	54 12.4	0.6	A	9.5	28.7	11.6		8.9	58.6	46.7	A
8.0	16.4	18.2	A	9.4	30 6.9	47.5		8.0	13.2	24.0	A	8.4	19 38.9	16.6		6.5	42 19.7	50.7	A
7.8	16.5	27.5	A	8.7	8.2	53.2	A	9.2	21.9	59.6		8.5	45.0	26.0		8.0	32.0	25.4	
9.5	6 26.0	6.3		8.8	32 9.3	16.6		9.3	55 2.4	26.0		9.5	20 23.0	40.4		9.3	52.0	9.8	
9.4	35.0	8.5		9.4	52.4	29.6		9.5	31.5	21.5		8.4	23.4	35.5		9.5	43 7.2	25.7	
9.2	7 5.6	22.2	A	9.5	55.2	51.9		9.5	45.2	10.1		9.5	21 43.1	18.1		9.5	35.4	42.6	
9.5	30.0	53.2		8.5	33 30.2	41.2		9.5	56 7.0	12.3		9.5	43.2	52.8		9.1	44 6.8	50.2	R
7.6	30.7	22.1	A	9.5	33.4	53.4		9.5	57 14.4	29.5		8.8	22 16.3	33.0		9.5	40.8	37.6	
9.5	54.4	39.4		7.5	55.8	42.5	B	9.5	15.2	36.9		9.0	18.9	14.4		9.5	43.5	33.7	
9.5	8 17.0	32.5		9.3	34 42.8	7.4		9.5	42.3	53.8		8.0	39.3	28.1	B	9.4	45 43.0	21.4	
9.1	47.5	13.5		9.4	46.6	48.6		9.5	58 24.4	59.3		9.4	43.8	11.9	B	8.0	46 1.1	12.8	A
9.5	9 10.3	0.7		9.5	50.2	24.8		9.3	39.0	29.0		9.5	56.0	41.4		9.5	27.3	18.3	
9.5	18.5	49.6		8.3	35 24.3	55.5	A	9.1	0 18.2	9.6	B	9.5	23 13.5	16.6		9.4	47 18.2	45.6	
8.0	19.9	24.6	A	9.4	36 9.9	28.8		9.1	19.2	21.0	B	7.0	24 14.6	40.9	A	9.5	48.4	13.8	
6.0	10 47.0	29.3	G	9.1	15.7	32.8	A	9.3	21.3	53.3		9.2	25 36.8	5.1		9.5	48 15.0	54.6	
8.8	11 49.2	56.0	R	9.1	35.2	9.0	A	9.5	37.8	9.2		9.2	48.3	57.7		9.5	36.2	28.7	
8.6	12 34.4	15.2		8.5	41.1	35.8	A	8.6	39.9	5.1	K	8.8	26 38.4	25.0		9.5	49 49.5	8.8	
9.4	13 47.1	4.7	B	8.5	55.7	23.8	A	9.5	40.0	28.0		9.3	39.0	41.9		9.5	50 26.6	25.7	
9.4	14 3.3	30.9		8.5	37 0.0	0.2	A	8.6	43.6	36.5		8.8	47.2	32.5		8.8	52 10.4	43.1	A
9.3	14.3	34.6	B	8.7	2.3	57.2		9.5	1 12.6	30.0		9.5	27 0.0	6.6		9.5	53 23.0	47.1	
9.0	15.0	22.6	A	8.5	5.4	7.7	A	7.8	27.4	51.4	A	9.5	55.3	9.4		9.3	27.2	10.8	
8.9	17.5	30.0	A	9.5	57.0	0.8	B	7.8	31.9	43.9	A	9.5	28 8.7	46.3		9.0	54 17.6	24.2	
7.7	25.5	7.5	K	9.1	38 17.2	38.3		7.8	43.9	37.4	A	9.2	37.9	51.1	B	9.5	38.0	46.1	
9.5	16 10.9	20.4		9.2	30.4	50.7		9.5	3 23.0	34.5		9.3	29 38.0	25.0		9.5	55 17.2	6.2	
9.2	32.9	13.3	A	9.5	39 8.3	57.2		8.9	56.7	9.3	B	8.5	30 26.0	24.5	A	9.5	26.5	32.7	
8.3	47.0	58.0	A	8.1	13.7	12.8	L	9.4	4 20.2	55.2		7.8	59.3	40.1	A	9.4	37.4	5.3	
9.2	17 41.7	30.5	R	9.4	33.7	48.9		8.8	5 24.9	59.3	A	7.7	31 1.6	23.9	A	9.1	56 19.0	36.1	
9.5	18 2.3	1.3		9.0	40 7.0	37.3		9.5	38.0	20.0		9.2	6.5	17.3	A	8.4	30.1	26.5	
9.1	19 1.4	57.4	A	8.0	11.6	41.8	A	7.5	6 26.4	23.6	A	8.3	15.3	18.2	A	9.5	33.7	57.5	
9.5	43.5	8.7		9.4	41 48.3	41.7		8.5	7 35.0	11.1	A	9.5	25.7	31.1		9.4	57 20.1	13.4	
8.7	59.0	58.5	A	9.4	42 13.9	4.9		8.8	42.0	26.5	A	9.3	29.6	27.3	B	9.1	31.1	16.9	B
9.5	20 49.1	53.6		9.2	19.9	28.2	A	9.5	46.4	46.9		9.5	35.7	32.3		9.5	36.8	5.8	
8.3	21 4.5	37.9	A	9.4	31.4	24.2		9.0	8 3.9	4.1	A	7.7	50.0	23.7	A	8.4	38.0	45.1	
8.1	5.8	25.0	A	9.3	36.4	1.3	K	7.7	9 24.1	54.9	B	9.5	32 11.5	28.2		9.5	58 0.4	33.2	
9.5	47.5	39.4		9.5	39.5	12.5		9.5	39.3	6.5		8.9	29.6	23.7	A	8.8	22.5	45.1	A
9.1	48.8	3.6	A	9.5	42.9	14.6		7.3	58.8	6.9	B	9.0	52.8	50.0		8.5	59 19.3	58.9	A
8.6	22 8.1	1.4	A	9.5	43 0.7	44.9		8.8	10 8.9	23.5	A	8.1	33 57.3	58.9	A	9.5	41.8	19.3	B
9.5	28.6	29.5		9.5	44 28.9	34.5		8.0	54.4	44.9		9.5	34 16.5	24.2		9.0	0 16.0	36.7	
9.5	23 18.0	19.6		9.5	33.1	7.1		9.4	11 3.0	23.2	B	9.5	21.0	41.3	B	8.7	21.0	4.3	A
9.3	50.2	41.5		9.0	45 40.3	55.0	A	9.2	12 0.5	29.5		9.5	25.3	55.9		9.3	1 13.5	47.1	
8.9	52.5	3.9	A	9.4	46 29.3	31.5	B	7.5	29.1	48.4	A	9.5	29.0	5.8		7.3	2 8.5	24.2	A
9.5	55.2	25.4		8.1	35.1	49.8	A	9.0	47.9	2.2		9.3	35 49.0	5.8	B	9.0	3 37.7	53.3	A
9.5	59.3	32.9		9.3	36.7	0.1		8.5	50.9	54.3	A	9.4	49.0	36.1		9.5	4 8.0	20.3	
7.9	24 5.2	13.9	A	8.6	47 17.4	1.7	K	9.5	13 11.0	36.5		9.0	51.6	31.2		9.3	12.2	19.0	B
9.1	35.3	7.6	A	9.2	48 3.2	37.9		9.0	14.4	10.6		9.3	53.0	54.8		8.8	51.0	28.7	A
9.5	47.6	40.7		9.2	4.9	16.1		8.5	24.5	29.0		9.1	36 4.4	57.6		9.1	6 4.7	53.6	
9.3	25 4.2	13.8	A	9.3	28.4	16.9		9.5	26.0	15.0		9.5	46.5	54.6		8.6	15.5	17.8	A
9.3	4.7	41.2		9.3	49 0.9	49.9		8.5	14 6.5	13.1		9.0	46.6	5.4	A	8.3	43.7	31.7	A
9.5	26 26.9	59.7		8.3	1.8	14.5	L	7.3	10.8	25.1	B	9.5	55.2	56.9		9.5	7 21.5	46.6	
9.4	37.8	52.5		9.5	8.2	57.3		8.1	56.5	6.3	B	9.1	37 23.0	15.3		9.5	21.5	23.2	
9.5	27 18.2	52.0		9.5	58.4	9.6		9.5	15 36.7	15.5		8.9	27.0	34.2		9.3	23.6	31.7	
7.5	18.4	24.1	A	9.4	50 15.5	20.8		9.5	39.3	55.3		9.2	34.1	43.2		9.5	8 35.0	46.1	
8.0	23.9	39.5		9.4	21.1	28.3	B	9.0	16 21.9	38.4		8.9	39 40.3	59.2	A	9.2	59.0	1.7	K

9ʰ—12ʰ +45°

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	9ʰ	+45°			9ʰ—10ʰ	+45°			10ʰ	+45°			10ʰ—11ʰ	+45°			11ʰ—12ʰ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	9 13.0	24.7		9.0	37 16.8	3.3	K	9.5	11 16.4	58.3	B	9.3	52 11.6	21.6		9.5	26 19.6	20.1	
8.8	23.5	14.3		7.0	25.6	46.2	A	8.2	12 27.5	23.3	B	9.3	29.4	41.5		9.2	35.4	13.7	
9.1	10 0.0	54.9		8.9	31.0	43.6	A	9.3	13 13.9	48.7		8.3	53 38.3	8.2	A	6.5	29 49.5	31.6	L
9.3	46.3	58.5		9.1	38 6.2	4.8		9.5	14 8.8	58.8		9.1	54 25.3	32.7		9.5	30 22.8	0.7	
9.3	11 20.1	18.3		8.9	39 50.4	54.1		9.5	18.7	15.5		9.3	53.1	22.6		9.5	23.4	10.7	
9.4	41.2	47.6		9.2	40 48.0	27.8		8.5	26.0	8.2		9.0	55 26.7	16.2		9.5	57.0	39.0	
9.0	43.3	25.4		9.3	41 13.6	18.7		9.2	50.6	49.0		7.8	27.4	6.3	G	6.5	31 6.1	54.6	A
6.8	48.0	58.5	A	9.5	13.8	6.9		9.5	17 18.8	45.5		9.3	44.9	43.1		9.0	14.0	52.7	A
8.6	12 16.6	32.1	A	8.0	18.0	45.2	A	9.5	59.2	36.1		9.3	58.0	27.8		8.3	22.9	6.3	B
9.1	13 2.0	37.9	A	9.2	50.7	26.8		9.3	18 16.1	14.2		8.7	56 14.7	55.3	A	9.2	23.2	9.3	
9.5	30.2	57.2		8.9	42 3.2	54.0	A	9.4	19 5.2	44.0		9.5	57 9.9	15.8		8.0	59.5	20.1	A
9.1	14 8.0	58.8		9.0	8.7	53.5	A	6.5	51.4	56.8	A	7.2	32.4	5.7	A	7.7	32 3.2	58.4	A
9.0	14.0	18.3	A	9.1	11.3	59.5		9.5	20 34.6	25.6		9.5	58 31.4	9.8		9.5	33 6.4	5.2	
9.5	40.5	41.2		8.9	45 43.0	21.8	A	9.3	21 11.2	52.1		9.2	0 31.0	17.0		9.5	6.8	47.0	
8.8	41.3	4.3	A	9.5	48.5	35.9	B	9.2	26.4	3.7	K	8.8	51.4	41.1	A	7.8	56.5	0.2	A
9.0	15 31.5	46.6		9.5	46 12.8	11.9		9.5	22 28.9	21.6		9.4	1 0.4	41.1	B	9.4	34 7.9	0.5	
7.8	46.0	13.8	A	9.0	16.7	3.8	K	9.3	35.7	46.6		3.5	30.3	17.7	A	9.3	19.3	11.7	
9.0	16 47.6	42.6	A	8.7	36.1	52.0	A	9.2	37.8	4.7		9.5	44.9	16.3		8.9	52.6	26.1	
8.5	49.0	11.8	A	9.5	47 55.8	42.1		8.8	41.4	0.3		9.5	53.1	46.8		9.0	35 42.2	21.1	
9.0	17 35.5	24.7		9.2	48 4.8	52.0	B	9.5	25 0.6	10.7		9.1	2 2.5	49.3	B	9.4	36 12.5	59.4	
9.5	52.6	9.8		9.3	26.2	21.3		9.5	26 10.7	9.2		9.3	4 33.0	52.6		7.3	37.1	17.2	A
9.5	18 1.0	22.7		9.5	43.6	15.3		9.0	38.7	33.6		9.4	6 55.6	54.1	B	9.5	41 22.5	47.5	
8.9	15.4	33.2	A	9.4	50 30.9	36.0	A	9.5	27 33.4	17.5		7.5	7 2.3	51.1	A	8.5	45.3	31.6	A
9.5	19 12.8	56.5		9.1	36.7	54.2		8.0	52.4	15.3	B	9.5	8 17.2	14.3		9.0	42 5.8	20.1	A
9.4	57.5	23.7		9.2	51 11.7	12.8	A	9.5	28 16.0	49.0		9.2	56.7	33.7		9.5	27.6	8.7	
7.2	21 12.5	24.1	B	8.9	35.9	9.4	A	9.5	20.3	29.6		8.3	9 16.4	28.2		8.6	43 20.4	55.0	
9.0	15.0	39.6	A	8.6	52 7.3	45.7		9.1	23.9	22.7		9.1	50.2	47.6		9.5	44 0.0	11.7	
7.5	30.5	19.0	B	9.5	10.4	40.3		9.5	29 28.0	37.6		9.0	10 30.9	20.2		7.9	7.8	37.0	A
9.2	31.4	18.7	B	9.3	19.1	8.7		9.5	30 10.2	6.2		8.0	45.8	20.5	L	8.6	16.7	25.1	A
9.5	22 13.0	41.6		9.0	58.9	11.4	A	8.5	23.8	35.6	A	9.3	11 33.8	29.7	A	8.5	43.9	1.7	A
8.6	42.9	41.6	A	8.6	53 27.0	16.4	A	9.5	56.7	46.0	B	9.3	12 15.7	50.1		9.0	45 2.6	31.1	
9.1	23 20.5	18.3		9.5	54 5.1	4.4		9.5	32 21.5	29.6		6.8	30.6	47.2	A	8.6	46 23.5	32.0	
9.4	24 5.9	49.4	B	9.5	7.2	34.8		9.5	27.9	51.5		9.5	13 4.4	16.2		9.4	24.4	27.6	
7.7	33.0	55.6	A	9.3	7.5	19.4	B	9.5	34 14.0	55.0		9.2	14 19.0	38.6		9.5	47 36.7	53.0	
9.2	51.0	52.6		8.0	20.4	19.8	A	8.8	40.1	22.0	A	9.0	46.7	6.3		9.5	48 38.5	52.0	
9.2	26 28.0	50.6	A	9.0	56 56.1	6.9		9.2	45.9	55.0		8.0	52.1	38.1	A	9.4	51.8	51.0	
9.5	40.1	57.0	B	9.5	57 20.1	23.3		8.6	52.4	42.1		9.0	58.8	10.4		8.3	49 44.3	49.0	
9.5	46.5	12.8		7.3	58 7.4	46.7	A	9.5	35 19.3	37.1		9.5	16 51.6	3.2		9.0	44.3	34.6	
9.4	57.0	44.6		9.3	8.6	58.0	B	8.8	39.9	26.3	A	9.4	56.3	45.0		8.1	50 48.3	31.8	B
9.5	27 25.7	9.3		9.5	23.7	59.0		8.0	36 43.8	43.6	A	9.3	17 18.5	27.6		9.4	51 34.1	37.5	
9.0	28 11.0	44.2	A	9.5	32.0	59.1		9.2	37 35.3	49.9	B	9.3	18 34.6	23.6		9.5	47.6	51.4	
8.4	21.0	4.3		8.2	44.9	51.2	A	9.5	42.8	15.2		9.2	34.8	31.1		9.3	52 15.6	8.7	
9.5	43.5	18.2		9.0	59 16.8	16.6	B	9.4	45.7	56.6	B	9.5	19 23.5	5.2		6.8	55.8	26.1	A
8.9	49.0	36.2	A	9.5	43.2	14.8		9.5	47.9	56.9		6.8	53.9	59.0	B	9.3	53 18.4	46.8	
8.6	29 19.3	57.2	A	9.5	54.9	41.7		9.5	38 1.2	56.9		9.0	57.4	48.0		8.0	54 5.0	26.1	A
9.4	24.0	6.8		9.4	1 16.4	43.7		7.7	39 39.9	34.6	A	6.8	20 2.1	41.0	L	9.5	55 30.8	19.6	
9.5	30 30.6	48.1		9.3	3 19.6	37.8		9.4	40 21.0	47.5		6.8	3.0	22.1	S	9.5	44.5	20.6	
8.5	31 17.3	10.8	A	9.5	59.6	16.9		9.3	47.6	22.1		9.5	19.5	59.9		9.5	44.5	1.2	
9.4	59.0	9.8		9.5	4 25.2	28.8		9.5	42 23.0	19.6		8.4	54.1	56.6		9.5	56 19.1	2.2	
9.3	32 7.1	22.7		9.5	56.4	54.1		9.2	43 22.4	34.6	A	8.6	21 31.1	8.2	A	8.6	26.1	41.0	A
9.5	51.2	11.8		7.8	5 16.4	49.7	A	9.5	44 30.3	53.0		9.3	43.9	31.6		8.0	48.1	15.2	A
9.3	51.3	59.5		9.5	25.5	28.8		9.3	46 6.9	15.7		8.6	22 4.0	28.1	A	9.5	57 27.6	44.0	
9.3	33 45.7	41.5		9.5	53.7	54.9		9.3	58.0	30.6	B	9.4	23 3.6	13.3	B	9.5	33.5	51.5	
7.5	34 28.0	22.7	L	7.5	7 36.8	45.7	B	9.0	47 37.0	56.1		9.5	9.3	32.5		9.0	58 11.5	3.2	
9.4	35 7.8	8.4		9.4	48.2	16.8	B	9.0	43.9	17.1	A	8.0	43.1	37.0	A	9.3	12.3	7.2	
9.0	23.0	4.3		9.3	8 6.0	28.3		9.0	49 15.4	8.2	A	9.3	24 12.0	1.7	K	7.8	39.2	11.7	A
8.0	37.0	4.8	K	9.4	9.1	56.9		9.0	33.9	30.6		9.3	54.1	4.7		8.0	1 13.6	11.7	A
9.1	44.3	36.7		9.1	27.0	22.3		9.3	45.8	4.3		9.3	54.8	21.1		9.1	2 4.4	18.2	
9.5	36 21.0	4.8		8.2	37.9	45.6	A	6.8	50 41.4	58.1	G	9.4	25 37.1	14.1		9.4	23.6	40.8	B
9.4	36.6	22.7		8.8	10 9.4	0.5	A	9.3	51 15.7	34.1		9.3	45.2	32.0		9.5	51.1	56.2	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	12ᵘ	+45°			12ᵘ—13ᵘ	+45°			13ᵘ—14ᵘ	+45°			14ᵘ	+45°			14ᵘ—15ᵘ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.5	3 22.7	58.4	A	8.9	38 2.4	42.2	A	9.5	31 48.5	57.6		9.0	21 55.4	7.8		7.0	52 30.3	3.0	A
9.0	4 10.0	4.2		9.5	39 25.0	22.3		9.5	32 4.1	7.8		9.0	22 6.0	43.5	A	9.5	35.9	53.1	
9.5	6 2.1	55.2		9.5	41 41.9	36.2		8.2	33 18.0	43.1	A	9.5	23 3.8	53.0		9.5	53 36.2	33.0	
9.5	21.2	9.0		9.5	42 20.8	41.7		7.8	34 15.6	43.4	B	9.2	8.0	1.3	A	6.8	54 55.3	10.4	A
9.5	27.2	3.3	B	9.5	52.8	8.0		9.2	37.4	54.2	A	9.3	12.1	19.7	A	9.5	55 36.9	15.7	
9.5	33.4	14.1		9.3	43 23.5	55.2	A	9.5	35 39.0	31.2		9.5	37.2	15.2		9.3	39.4	54.1	A
9.5	48.0	8.5		9.5	27.2	53.9		9.4	36 54.6	31.8		9.5	38.5	1.3		9.0	44.4	58.1	A
8.8	59.9	32.1	A	9.5	47 46.7	46.2		9.4	37 57.8	35.9	B	9.5	25 11.0	47.1		8.5	57 15.8	4.9	J
9.1	7 10.0	51.0		9.2	48 16.0	54.2		9.5	39 7.5	6.8		9.0	42.5	59.2		8.7	29.7	41.3	A
9.5	25.1	57.9		8.7	27.4	5.4	A	9.5	41 54.1	24.7		9.2	48.7	43.6	A	9.5	37.2	24.8	
9.3	8 44.6	56.1		9.3	45.5	20.8		8.3	42 38.4	53.6	A	7.8	26 56.9	26.0	B	6.2	58 0.3	12.9	A
9.0	9 5.7	31.6	A	9.5	49 6.0	28.8		9.5	43 10.3	12.3		9.2	27 22.1	45.0		9.4	12.8	30.6	B
9.1	8.1	17.2		9.2	19.5	15.4		9.3	38.8	0.8	A	8.7	22.4	44.1	B	8.0	29.7	33.3	A
8.3	26.1	12.2	A	9.0	21.5	3.4	A	8.8	44 55.1	4.8	A	9.5	28 31.2	46.4		9.5	0 34.9	58.1	
8.3	27.1	23.1	A	9.5	50 18.7	21.8		9.5	45 12.3	8.8		9.4	37.8	38.4	B	8.3	1 26.2	12.9	B
8.0	39.0	53.5	A	9.5	51 38.4	20.8		9.4	47 24.6	30.2		9.4	29 7.7	56.0	A	8.8	2 35.1	15.9	
8.8	10 20.3	30.6	A	9.5	38.9	43.7		8.3	48 14.5	26.2		9.5	31 23.6	53.3		9.5	4 6.8	22.9	
8.7	25.2	58.8	A	9.5	52 0.0	34.3		9.4	30.8	53.2	B	8.4	47.0	15.1	B	9.3	9.6	53.7	
8.9	28.3	51.5		9.4	8.4	36.3		9.4	49 20.8	0.8		8.0	55.4	24.7	A	9.4	23.8	46.8	
9.1	59.7	8.9		8.1	53 13.6	18.8	A	8.6	51 44.0	51.7	A	9.4	58.1	30.1		9.5	58.5	43.2	
9.0	11 9.3	8.7	B	9.5	49.7	51.6		9.1	52 22.1	36.2	A	9.5	32 24.0	39.6		8.8	59.6	40.7	A
9.4	12 17.3	44.5		9.5	54 24.9	8.4		9.0	44.3	23.2	A	9.0	33 4.9	16.4	A	8.0	5 8.4	24.4	A
8.5	18.4	41.0	A	9.0	55 35.4	38.7	A	9.0	44.8	18.2	A	8.4	23.7	57.9	A	9.1	26.8	45.9	
9.5	29.0	9.3		9.5	56 26.5	30.2		8.8	53 10.0	31.7	R	5.3	27.6	1.4	G	9.2	43.2	44.7	
8.9	13 1.1	6.7	A	9.5	59 42.0	14.9		9.3	15.0	5.8		9.3	34 46.2	29.4		9.5	6 47.4	8.0	
8.7	22.2	1.7	A	9.5	0 20.3	22.8		8.9	24.2	19.7	A	9.5	35 9.3	17.6		8.7	7 5.5	41.8	A
9.3	26.8	27.1		9.5	2 1.0	32.3		9.4	54 23.2	31.0	B	9.4	21.3	24.2	B	9.2	38.8	57.6	
9.5	16 28.9	38.6		9.3	5.0	26.2	A	7.9	55 20.5	59.0	A	9.0	33.9	12.8	A	9.2	40.6	49.2	A
9.5	43.5	28.7		8.6	3 10.1	4.9	A	9.3	39.5	59.2	B	8.0	36 9.8	0.0	A	9.4	9 11.0	31.2	
8.9	48.2	50.5	A	9.0	4 0.4	40.7	A	9.3	54.6	15.8		9.2	37 6.4	0.0		8.8	10 2.3	37.8	A
9.1	18 1.4	36.7	A	9.5	20.2	57.2	B	9.1	56 2.8	50.4	A	9.2	40.5	15.9		9.0	30.6	48.2	A
9.2	31.0	52.1		9.5	5 14.5	46.8		9.5	58 32.0	49.6		8.8	48.6	5.0		9.1	39.5	23.3	A
7.8	41.4	32.7	A	9.1	6 6.6	14.9	A	9.5	54.5	28.7		9.2	38 20.9	51.5	A	8.9	11 14.4	55.1	
9.4	46.1	26.8	B	8.8	25.2	9.4	A	7.3	59 47.6	2.3	A	6.8	39 11.8	48.2	A	8.0	18.3	7.4	K
9.2	19 15.5	31.2	A	9.5	44.5	46.7		9.0	59.5	56.3		9.5	18.4	10.9		9.5	30.1	22.7	
9.5	20 3.0	20.3		8.3	7 59.0	56.6	A	9.4	2 22.2	44.6	B	9.3	31.9	4.0		9.5	12 52.9	48.7	
9.5	11.4	3.4		9.5	8 6.8	36.8		9.0	6 2.0	52.0	A	9.0	49.2	35.8	A	7.4	13 43.3	33.3	A
7.0	21 4.4	35.8	S	9.5	50.0	6.9		9.0	9.1	1.3		8.1	40 34.3	0.7	B	9.0	14 49.8	26.9	A
8.8	13.7	54.4	A	9.3	9 44.4	59.6	A	9.0	37.5	35.6	B	9.4	45.2	4.7		9.5	15 5.4	4.5	
9.2	41.5	0.9		9.0	52.5	28.2	A	8.9	57.1	53.0	A	9.5	41 23.5	59.1		8.8	17 15.7	39.2	A
9.5	23 41.5	31.8		9.1	10 31.3	47.2	A	9.3	7 31.4	52.7		9.3	44.9	15.9	A	9.2	15.8	39.6	B
9.5	24 48.0	5.9		9.5	11 56.4	21.2		9.2	44.5	46.6	A	9.5	42 59.2	54.5	B	9.3	18 23.4	3.7	
9.1	25 15.4	57.2		9.3	12 43.5	48.6		9.0	8 8.1	59.9		9.5	43 55.9	22.9		9.1	28.6	11.2	
8.9	18.7	28.3	A	8.5	57.5	51.9	A	9.3	31.1	22.7	A	9.5	44 14.3	52.7		5.9	19 12.3	47.4	A
9.5	50.2	35.2		8.2	14 2.9	52.1	A	8.0	9 19.6	1.8	A	8.1	22.8	29.0	B	9.5	20 8.1	37.6	
9.5	26 17.9	1.9		8.0	16 26.4	27.6	A	9.4	26.6	17.7	A	9.4	45 18.6	47.8		9.0	21 48.8	55.7	A
9.5	27 14.4	47.2		9.5	17 32.9	52.1		9.5	28.5	46.6		9.5	36.5	1.4		9.3	22 7.1	6.7	
9.0	28 17.2	13.0	A	7.8	19 30.7	14.8	A	9.5	10 38.6	7.4		7.3	46 9.3	12.4	B	9.0	51.6	1.7	K
9.5	23.5	19.8		9.3	20 41.6	58.3		8.4	12 6.5	23.2	A	7.3	14.4	31.9	A	9.5	23 36.8	40.5	
9.1	27.2	37.3	A	7.9	21 10.2	25.6	A	8.4	15 40.9	58.9	A	8.5	33.9	46.2	A	9.4	25 0.4	0.2	
9.5	29 7.0	28.8		9.4	49.8	31.2		8.6	16 11.7	13.2		9.0	47 0.4	12.4		9.4	10.6	49.7	B
8.5	33.2	41.8	A	9.5	22 54.3	39.1		9.3	35.2	53.0	A	9.5	48 33.8	43.8		8.9	43.7	7.6	A
9.3	36.0	54.1		7.7	24 19.6	19.7	A	9.5	36.8	3.2		7.3	49 16.1	53.5	A	9.4	52.2	46.5	
9.3	30 46.5	39.0		8.5	25 0.3	24.7	A	9.5	51.3	37.0		9.5	50 15.7	58.6		9.4	26 1.7	56.9	
9.5	31 1.0	32.5		9.1	26 46.1	32.6		9.5	18 8.5	43.0		8.8	21.5	29.3		9.5	24.9	10.7	
9.4	32 44.5	31.2		9.5	49.0	59.5		9.3	36.0	12.5		9.2	27.9	20.4		9.2	27 1.1	33.6	A
8.7	52.4	41.2	A	8.2	27 7.5	1.3	K	8.9	48.5	3.1	B	8.7	51 3.9	59.8	B	8.5	26.9	13.9	K
9.2	35 52.2	24.8	A	9.2	43.5	39.1		8.8	19 10.0	47.5		9.0	40.1	21.8		9.5	40.6	42.5	
9.4	36 49.5	30.9	A	9.2	29 43.5	8.3	A	9.3	29.6	20.2		8.8	44.3	1.4		9.0	44.1	45.0	K
9.4	37 15.5	29.8	A	8.1	50.8	45.5	B	9.5	20 21.0	39.5		9.4	52 3.0	9.0		9.0	50.4	18.7	B

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	15ᵐ	+45°			15ᵐ—16ᵐ	+45°			16ᵐ	+45°			16ᵐ—17ᵐ	+45°			17ᵐ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	28 17.6	19.7		8.9	56 45.5	54.1	A	9.0	26 49.4	53.7		9.5	56 38.0	37.7		9.5	26 31.8	3.3	
9.5	29.8	57.4		9.2	57 43.2	14.3		5.7	27 26.7	56.0	A	9.3	58 6.0	24.3		8.4	36.2	41.2	A
9.5	53.2	16.7		8.8	46.7	21.3	A	9.3	28 38.6	46.5		9.0	10.0	16.3	R	9.2	46.5	30.2	
8.2	29 43.9	24.1	B	9.5	53.7	57.8	B	9.0	39.4	26.1		9.1	59 6.7	53.1	A	9.0	52.3	43.6	
8.0	48.7	23.5	B	9.1	58 30.2	41.1		9.5	29 22.1	38.0		9.4	20.1	37.5		8.8	27 8.9	44.8	B
9.5	30 4.9	45.0		8.3	32.9	7.7	A	9.5	26.6	5.7		9.4	28.3	36.5	B	9.5	20.0	46.1	
8.2	52.3	56.0	A	8.9	46.3	14.8	A	8.8	47.6	2.7	K	7.8	41.0	39.2	A	8.3	54.0	25.7	A
9.4	31 32.4	19.3		9.5	59 13.2	41.1		9.3	31 38.5	45.5		8.3	0 36.0	25.2	A	9.3	28 5.7	48.6	
9.5	32.6	35.5		9.1	49.2	21.6	A	9.0	40.6	6.7	K	9.4	1 28.0	6.0		9.1	8.5	21.3	
8.0	36.7	25.8	B	7.8	1 23.2	53.6	A	9.0	32 19.1	6.2	K	9.2	44.9	5.4	K	9.0	43.6	57.0	
8.2	39.5	32.2	B	9.2	2 1.3	37.7		9.2	43.6	47.8	K	8.2	49.5	12.3	A	9.2	29 15.4	56.1	
9.5	32 38.7	10.7		8.7	35.4	26.2	A	8.8	33 12.9	27.1		9.4	2 5.4	20.3		9.5	15.6	21.8	
9.1	33 20.2	20.1	A	8.9	37.7	20.7	A	9.4	37.6	49.0		8.8	58.5	20.3		8.0	24.5	40.6	A
9.5	25.7	49.0		7.0	3 27.0	45.7	K	8.7	34 38.7	52.7	A	9.1	3 37.0	27.3	A	8.8	24.9	54.8	
9.0	34 1.5	15.6	A	9.0	41.7	35.7		9.5	35 31.1	26.1		9.4	42.1	47.1	B	7.6	30.5	24.7	A
9.5	19.6	50.4		3.8	4 16.2	19.7	A	9.2	51.0	52.7	K	9.0	42.5	26.8	A	9.5	44.5	21.2	
7.9	25.1	35.3	B	8.2	24.0	43.1	A	9.3	36 13.0	34.7		9.4	48.0	47.8		9.3	30 34.1	7.8	
7.3	35 30.9	18.1	A	8.3	50.7	4.9	A	9.5	31.1	30.3		9.1	4 32.5	26.3	A	8.9	31 1.0	12.5	K
9.4	33.0	24.1	B	9.1	5 16.3	43.7	A	9.1	48.6	0.7		9.5	34.6	35.2		9.0	24.0	52.4	
9.0	36 3.6	14.6	A	9.4	7 11.1	50.8	A	8.7	52.4	55.0	A	9.5	48.0	52.6		9.3	25.3	7.5	
8.5	37 22.2	28.6	K	9.0	28.8	49.5	A	9.5	37 35.0	30.3		8.3	5 22.3	32.7	A	8.8	28.2	14.9	A
8.8	40.4	16.1	K	9.5	9 3.7	19.8		8.8	41.6	26.6	A	8.5	53.5	12.8	K	9.5	57.4	2.5	
8.3	38 3.9	27.6	K	9.0	11.6	8.3	K	8.9	39 8.9	12.2	A	9.3	7 7.0	18.3		9.5	32 2.2	16.8	
9.5	37.1	57.2		9.1	42.7	32.2		9.2	25.1	22.1		6.3	27.2	30.8	J	9.2	3.6	57.6	B
8.0	39 24.1	46.5	K	8.3	10 30.0	48.6		9.3	40 19.8	30.4	B	9.2	53.6	54.7		9.5	10.3	25.8	
8.6	40 37.4	14.7	K	9.5	44.7	2.4		8.2	51.1	22.2	B	8.5	8 7.5	30.2	R	8.0	20.7	48.2	A
9.3	41 5.9	52.3		9.2	11 29.2	31.8		9.0	41 3.6	1.2		9.5	30.6	59.0		9.2	32.2	5.6	K
8.8	7.0	48.1	A	8.7	42.7	1.3	K	9.0	4.6	37.1		9.3	9 2.0	39.6		9.3	41.0	19.9	
7.3	32.7	27.6	A	8.4	12 3.6	25.8	K	8.4	5.7	53.3	B	7.2	15.5	33.2	A	9.5	33 11.7	59.1	
9.5	55.5	7.5	B	8.6	37.2	40.6	K	9.5	42 33.6	52.5		8.8	10 6.4	49.6	A	8.8	15.3	4.6	K
8.9	42 11.9	2.2	K	8.8	13 36.1	16.6	B	9.0	43.9	38.5		8.0	16.2	21.0	A	7.9	17.5	18.4	B
9.2	34.6	43.7	A	9.3	14 2.0	31.2		9.0	43 17.1	27.1		9.5	33.0	18.3		9.2	36.7	18.8	
9.5	35.0	12.7		8.5	15 37.0	33.2	A	8.4	44 37.6	28.1	K	8.8	11 58.3	1.3	A	7.3	56.2	39.7	L
6.9	37.4	1.8	A	7.0	16 8.3	54.5	A	9.0	45 14.2	4.7	K	8.4	12 14.3	57.3	A	9.2	34 3.4	4.9	
8.5	53.2	31.0	A	9.3	17 2.6	8.0	A	9.5	46 34.1	21.1		9.2	46.0	41.7		9.0	41.2	26.8	
9.4	43 14.1	59.8		9.5	28.9	31.8		9.5	56.6	3.2		8.5	59.5	49.6		9.5	35 17.7	11.8	
9.5	21.0	58.6		9.5	49.2	8.9		9.5	47 1.7	15.7		8.6	13 20.6	50.4	A	9.5	55.2	22.8	
9.1	28.4	1.9	A	9.5	52.6	59.5		9.0	37.1	36.1	K	9.3	31.0	32.2		8.9	37 7.7	49.2	A
8.8	55.7	22.3	A	8.6	20 9.2	6.9	A	8.3	41.3	50.7	K	8.6	31.3	44.6	A	9.5	21.0	19.8	
8.9	44 55.1	1.9	A	7.0	18.7	1.8	A	8.1	41.4	47.7	K	9.5	14 27.0	48.6		8.4	48.2	34.7	A
9.0	45 58.2	26.8	A	9.3	18.7	26.8		9.5	48 30.4	53.7		6.5	15 40.0	26.3	R	8.9	52.3	8.4	K
9.5	46 13.6	58.8		9.5	32.5	33.2		9.4	49 24.1	0.3		9.5	16 6.3	13.9		9.5	38 12.6	3.3	
9.5	58.0	46.2		9.2	39.0	10.8	A	9.3	36.2	41.4		9.1	8.0	8.3	K	9.3	18.8	42.7	
8.8	47 6.2	7.4		7.1	54.5	43.1	A	8.9	43.5	51.1		8.0	52.6	7.3	K	9.5	56.4	4.4	
8.4	48 48.3	23.2	A	9.4	21 15.2	44.6	B	9.4	45.2	7.2		9.5	17 51.4	38.7		9.3	39 5.5	50.2	
8.6	49 39.9	21.5	A	9.0	43.2	2.3	A	9.3	50 14.5	58.1		9.2	18 6.2	38.4	B	9.2	31.9	17.8	
8.7	50 21.9	24.8	A	9.4	22 18.4	36.1	B	9.0	51 16.3	52.7	K	9.3	15.0	35.9	B	9.5	32.7	41.7	
9.3	24.4	47.1		7.3	24.4	16.8	K	9.5	52.8	52.8		9.5	45.3	40.4		7.2	53.8	5.8	A
9.4	51 43.0	58.4	A	8.5	48.0	42.7	A	9.0	52 12.7	18.2		9.5	55.9	43.6	B	8.7	40 12.2	35.2	R
9.5	52 4.7	10.4		8.9	55.9	30.8	A	9.2	15.7	18.5		9.2	20 25.2	38.2		8.8	21.3	14.8	
9.2	13.9	55.8		8.5	23 23.7	35.6	A	9.3	45.0	41.1	B	8.0	27.1	28.2	A	9.5	41.4	44.2	
9.5	33.7	25.3		9.5	42.2	19.8		9.3	55.0	34.3		9.0	31.8	50.7	A	9.2	57.7	51.6	
8.4	53 50.1	59.5	B	9.1	24 38.7	47.5	K	8.8	57.5	40.9	A	9.3	21 7.9	50.8		9.5	41 17.7	43.2	
9.4	54 56.9	5.0		9.5	50.2	10.7		9.4	53 33.6	20.8		9.5	31.5	30.8		9.5	29.3	17.3	
8.7	55 7.6	52.1	A	9.5	53.1	22.6		9.4	34.9	47.4		8.7	22 16.5	6.9	K	7.8	42 35.1	55.1	A
9.3	21.8	39.5		8.5	25 41.6	11.9	A	9.4	42.2	36.5		8.7	23 13.9	53.8		8.5	51.2	28.3	A
9.2	22.5	23.2		9.5	45.4	1.7		9.5	54 25.8	7.4		9.2	24 21.3	56.1		9.2	59.7	35.7	
9.2	35.9	38.0	B	9.1	26 9.7	54.7		9.2	51.5	58.1	K	9.5	36.5	34.7		9.4	43 24.3	3.2	
9.3	56 10.9	19.3	A	9.3	15.6	41.2	A	9.5	56 1.6	28.8		9.5	25 6.2	24.3		9.5	44 5.0	14.3	
8.5	17.7	24.3	A	9.0	23.6	36.5	A	7.2	19.6	59.6	K	8.0	26 3.5	45.6	A	9.3	9.6	8.5	

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	17ᵘ—18ᵘ	+45°			18ᵘ	+45°			18ᵘ	+45°			18ᵘ—19ᵘ	+45°			19ᵘ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.5	44 38.2	47.7	A	9.2	4 16.3	24.9		7.6	23 39.6	4.0	J	9.5	46 33.9	32.5		9.4	4 37.6	6.5	
8.1	40.2	45.2	A	8.5	45.4	45.3	R	7.7	44.5	58.3	A	9.4	47 13.2	35.0		8.9	5 8.4	15.0	A
9.0	45 2.2	24.3		9.3	46.0	10.0		9.1	44.5	56.0		8.4	51.1	3.6	A	9.3	34.2	45.4	
9.5	3.5	52.6		8.8	48.0	26.4	A	9.5	24 0.8	1.5		9.5	48 10.2	27.6		8.6	48.9	39.4	
9.3	5.4	55.4		9.4	5 11.8	52.9		9.3	1.1	37.1	B	9.5	13.0	53.1		9.2	50.7	41.9	
9.0	22.2	12.3		8.6	30.0	48.3		9.4	40.9	10.1		9.5	17.6	37.0		9.1	6 4.3	4.7	A
9.5	46 22.7	0.4		8.5	39.8	35.4	B	9.5	25 15.2	20.1		9.5	52.3	14.7		8.5	17.1	29.5	A
8.8	36.7	13.8		9.4	47.5	33.2		7.0	16.7	53.0	A	9.4	49 1.7	49.9		9.3	20.0	58.5	
8.8	38.4	19.8		9.2	57.7	11.5		9.5	26 32.9	22.1		9.1	7.0	34.6		9.2	20.9	52.4	
8.7	47 9.1	1.3		9.2	6 31.5	48.3	B	9.4	39.4	52.2		8.8	36.2	14.6	A	9.4	7 14.2	16.5	
8.8	15.7	45.5		8.2	46.1	16.2		8.5	57.2	20.7		9.5	51.6	29.6		9.5	58.7	25.5	
9.3	23.7	33.2		8.8	50.4	45.8	A	6.8	27 38.5	53.4	A	9.0	50 8.2	38.0		9.2	8 5.1	46.9	A
9.0	26.7	56.1		8.3	50.9	38.5	A	9.4	41.4	32.6		9.5	12.2	59.2		9.5	37.2	7.3	
9.3	48 42.8	48.2		9.5	7 12.2	42.0		9.5	28 3.6	25.2		8.5	13.1	11.7	A	8.8	53.4	52.0	A
9.4	49 28.2	3.8		9.5	8 49.0	7.6		9.1	9.6	4.0		9.3	51 32.2	19.8		9.3	9 5.4	5.8	B
9.5	51.0	13.9		9.4	53.7	53.2		6.8	12,4	41.0	A	8.9	52 6.4	19.4	B	9.1	21.6	19.5	
8.2	50 5.5	41.3	A	9.5	59.3	38.2		9.3	18.7	6.2		7.9	7.3	18.9	B	9.4	25.2	53.3	
8.3	16.3	51.6	A	8.0	9 16.4	31.6	L	6.5	31.5	59.0	A	9.0	26.9	20.5	A	8.9	52.7	28.5	
9.2	23.3	32.5	B	7.5	28.1	38.0	L	9.5	29 2.1	9.2		7.0	50.2	40.4	A	8.0	10 5.4	22.0	L
8.0	31.5	34.3	A	9.4	34.0	27.5		9.4	28.2	31.6		9.0	52.2	30.9		9.3	7.7	47.3	
7.7	33.0	14.4	A	9.4	53.7	40.5		9.2	33.6	51.5		8.0	53 10.9	39.9	A	9.3	26.8	49.3	
9.5	51 23.8	10.0		9.4	56.6	35.7		8.8	30 4.9	3.2		9.3	11.4	58.6		9.4	41.4	52.1	
9.5	55.0	10.5		9.5	10 7.2	53.5		9.5	31 3.2	36.0		9.4	24.9	59.8		8.5	53.1	55.0	
9.1	52 0.4	21.9	B	6.2	11 22.9	8.7	A	9.4	30.1	32.5		9.5	44.2	25.0		8.8	11 1.0	59.0	
9.2	9.3	5.0	K	9.5	27.4	41.5		9.0	33.7	20.2		9.0	47.6	40.9		6.9	5.9	4.3	K
6.7	32.0	0.6	K	9.5	38.2	32.6		9.0	32 32.1	41.0		9.5	54 7.1	2.8		9.3	11.5	6.4	K
6.3	39.0	22.9	A	9.1	56.6	47.0		8.0	33 4.4	32.1		8.5	48.7	14.0	A	9.1	51.6	4.1	K
9.5	54.3	22.9		9.5	12 23.7	29.1		8.8	10.5	41.8		9.5	50.2	17.5		9.5	12 32.3	36.4	
6.4	59.5	53.0		9.4	13 7.6	48.0		9.5	22.7	25.1		9.3	55 14.5	1.0		9.5	13 4.8	30.9	
9.5	53 16.2	14.9		7.2	14 1.9	5.4	A	9.4	35 5.2	0.4		9.2	30.7	48.9		9.0	9.0	53.7	
9.5	52.5	19.9		8.9	7.7	30.2	A	8.3	15.2	14.1	A	9.1	31.1	45.4		9.5	14 0.2	17.0	
8.5	54 9.7	44.8	R	9.4	35.2	34.5		9.3	24.1	8.1		9.4	44.8	28.5	B	9.5	47.3	4.9	
9.1	20.0	2.6		9.2	49.8	38.2	B	9.2	25.6	6.2		8.5	48.4	23.5	A	9.2	53.1	12.8	K
9.0	32.1	29.9	B	9.1	15 8.0	52.7		9.1	27.5	18.2		9.0	56 14.2	37.4		9.5	57.2	44.3	
6.4	43.4	28.1	A	9.5	38.7	57.5		9.5	46.6	31.1		9.5	45.6	28.0		9.3	15 13.9	28.5	
9.5	55.2	3.9		9.5	50.6	30.6		9.0	52.4	43.1	A	9.0	57 17.3	26.9	A	9.5	59.5	24.9	
9.5	55 31.7	5.5		9.0	58.9	51.4		8.8	57.2	16.2		8.5	25.9	24.5	A	8.5	16 6.3	19.0	A
6.0	49.4	30.9	A	9.5	16 16.5	55.2		9.5	59.4	59.7		8.5	38.0	19.1	A	9.3	11.5	24.6	
8.5	55.0	37.8		9.3	19.6	51.0		9.5	36 16.2	9.3		9.0	47.1	38.8	B	8.5	15.9	58.1	
9.4	56 12.8	47.9	B	9.4	17 26.2	0.8		8.5	19.7	57.3	A	9.3	53.2	2.6		9.4	16.6	4.3	
9.5	25.5	44.8		9.5	48.7	18.7		7.8	37 23.0	41.0	A	9.4	58 14.4	9.6		9.4	20.2	32.2	
9.5	47.5	32.4		9.0	18 16.9	40.6		7.5	29.6	46.6	A	9.5	46.7	7.5		8.6	24.2	30.5	
7.0	58.2	20.9	A	9.0	25.1	15.1		9.5	38 11.7	41.6		9.5	59 25.8	3.8		9.5	51.6	8.7	
9.5	57 10.0	26.9		7.8	53.0	8.3		7.7	39 41.6	36.5	A	8.6	28.7	22.5	A	9.2	18 1.8	30.7	
9.5	16.0	16.4		8.9	19 36.7	56.7		8.6	40 3.4	57.6	B	6.8	0 18.7	40.9	A	9.3	5.0	15.9	B
8.3	58 29.8	6.1	K	9.5	59.6	27.7		9.2	19.2	41.1		9.5	40.6	4.1		8.6	10.2	35.7	B
8.9	33.0	20.9		9.5	20 1.4	48.7		9.4	30.1	40.6		9.2	46.4	21.9	B	8.4	15.0	3.8	A
8.9	49.0	25.4		8.8	2.9	35.6		9.2	47.9	23.2		9.5	56.0	21.7		9.3	48.2	45.2	
8.4	59 19.1	57.2	A	9.4	23.0	49.7	B	7.8	56.0	58.3	A	9.5	58.8	26.9		9.2	54.1	24.6	
9.0	27.0	12.9		8.9	50.1	23.1		8.8	42 13.8	15 7		9.5	1 6.7	29.4		9.5	19 15.6	56.7	
9.5	37.0	27.7	B	9.0	55.1	0.9		9.4	43 13.5	55.9		8.5	47.1	35.4	A	9.5	20 17.0	51.2	
7.5	0 57.0	41.3	A	9.1	21 45.4	8.6		9.5	18.0	2.8		8.5	59.4	34.9	A	9.5	20.4	4.0	
9.5	1 0.4	44.3		8.0	48.2	43.6		9.3	26.9	15.1	B	9.4	2 45.6	0.8	R	8.5	25.5	3.7	B
9.1	2 12.0	37.8	A	9.5	22 17.3	2.8		8.1	50.4	34.0	A	8.0	3 8.2	50.4	A	9.4	40.1	43.2	B
9.5	30.8	34.3		9.0	27.4	21.1		9.5	44 2.5	54.7		8.5	13.0	40.0	A	9.5	21 16.2	28.5	
9.3	54.1	37.3		8.2	37.4	59.0	A	9.3	10.0	13.4		8.8	25.1	53.0		9.3	36.1	38.5	
9.4	57.5	10.0		9.2	39.2	38.1		6.6	21.1	6.2	A	9.5	35.2	58.4		9.0	50.0	10.5	K
8.5	3 6.8	4.5	A	9.0	49.6	46.5		9.4	34.2	10.8		9.2	35.4	24.5		9.1	22 21.1	53.1	A
9.2	40.1	1.5	A	9.5	23 7.2	55.5		8.3	52.6	8.5	A	8.9	42.6	21.5		8.0	32.1	32.9	L
9.3	58.5	13.4		9.2	17.4	52.2		8.9	45 53.7	18.7	A	9.4	4 16.2	53.7		9.4	41.6	19.1	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	19ᵘ	+45°			19ᵘ	+45°			19ᵘ—20ᵘ	+45°			20ᵘ	+45°			20ᵘ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	23 6.0	49.9	A	9.3	39 7.2	23.1		9.0	53 28.1	46.4		9.5	6 31.0	29.2		9.3	14 44.9	54.8	A
9.3	8.0	53.6	B	9.1	22.4	19.5		8.4	52.6	0.6	G	8.9	33.9	46.7		9.5	15 8.0	54.5	
8.7	24.5	53.2	A	9.4	25.7	48.3		9.3	54 18.8	59.1		9.5	36.5	48.4		9.4	8.7	47.6	
9.3	24 25.7	37.4	B	9.5	25.7	59.2		9.1	43.6	19.0		8.1	48.0	16.6	A	9.5	10.2	42.3	
9.0	27.1	59.4		9.5	40 10.1	2.0		5.8	47.0	22.7	G	9.3	48.0	51.3		8.4	42.9	6.7	A
8.6	28.2	44.9	A	8.3	25.2	38.6		9.5	55 2.0	25.2		8.5	57.1	0.3	A	9.0	49.5	43.4	A
9.5	43.1	20.1		9.4	25.4	43.0		9.5	22.1	13.5		9.4	7 1.3	0.6	A	9.5	16 2.0	32.3	
9.2	46.4	57.1		8.5	39.6	38.5		9.5	30.2	24.1		9.5	16.9	11.8		9.5	9.7	1.2	
8.8	25 11.5	11.7	A	9.4	44.5	6.4		9.5	39.4	41.6		9.5	20.8	32.4	B	9.2	24.6	35.4	A
9.0	33.9	34.0		9.2	41 23.0	55.8		9.4	40.6	55.5		9.5	23.0	31.4		9.0	33.7	19.3	A
9.4	40.2	13.5		7.2	49.4	22.9	B	9.2	41.8	3.5		9.0	26.0	51.2		9.5	47.3	1.4	
8.3	41.6	9.6	A	9.3	52.7	49.5		9.0	46.3	56.5	B	8.5	29.7	53.7		5.8	17 21.4	19.2	A
7.0	54.0	51.4	A	9.5	42 12.2	38.5		9.3	56 2.4	48.2		9.3	33.5	10.2		8.6	22.9	33.7	A
8.5	26 18.9	18.5	A	8.6	59.4	31.4	A	9.2	3.5	40.8		9.3	40.9	9.8		9.4	30.4	51.7	
9.3	48.5	41.0	A	8.8	43 45.0	5.4	A	8.7	30.7	35.9	A	9.2	58.8	59.0		8.5	44.9	52.6	A
9.4	27 2.3	47.9	A	9.3	44 27.1	59.1		9.3	42.6	17.4		9.2	59.7	4.6		8.7	47.4	45.2	A
9.5	28 5.4	3.3		9.0	34.2	29.5		9.2	57 5.1	40.6	A	9.5	8 12.8	22.0		9.5	50.7	1.2	
8.5	14.9	44.5	A	8.9	53.6	34.0		7.9	10.1	4.1	A	9.4	20.0	42.2		9.2	18 0.0	45.4	
9.0	20.2	47.9	A	9.5	57.8	51.8		9.5	22.3	59.7		9.5	33.5	22.7		9.5	7.0	25.5	
7.2	46.7	44.4	A	9.5	45 12.3	59.7		9.5	36.5	15.0		9.5	40.5	2.7		9.1	11.4	33.2	A
9.5	52.1	48.9		9.4	14.7	50.5		9.4	47.6	44.4		8.0	9 13.5	40.6	A	8.8	24.4	10.4	A
9.3	29 41.0	39.0	A	9.1	24.3	39.0		9.5	59.8	2.6		9.1	14.4	13.1		9.2	45.5	41.0	
9.1	58.3	40.0	A	9.4	28.5	50.4		9.5	58 4.2	7.0		9.3	34.2	51.7		8.8	47.6	55.7	A
9.3	30 14.2	37.0	A	9.5	43.2	27.5		8.2	22.0	34.6	A	9.4	37.5	22.8		9.1	55.0	10.9	A
9.4	21.6	17.6	A	9.5	55.3	1.2		8.8	57.8	12.8		9.3	37.9	14.5		8.8	57.9	22.8	
9.5	22.7	20.5		9.5	46 29.6	13.0		9.0	59 6.2	27.3	A	8.5	47.9	10.7	G	8.6	19 4.5	49.9	L
8.3	31 5.1	6.9	A	9.2	39.4	37.3	B	9.3	11.4	11.5		9.5	51.4	27.0		9.5	13.5	22.6	
9.3	32.6	18.5		9.2	45.7	56.7		8.1	43.7	55.4	A	9.5	52.0	34.4		9.5	27.9	43.8	
7.0	32 4.9	29.0	A	9.4	47 1.5	50.2		8.8	56.3	19.6	A	9.4	59.3	13.9		9.3	32.0	29.7	
9.0	12.4	49.1		9.2	9.2	9.4	A	8.0	0 9.8	56.6	A	8.9	10 6.3	46.9		8.9	47.6	48.6	A
9.5	18.8	59.7		9.5	10.1	17.5		9.4	44.0	6.7		9.5	32.2	1.2		8.8	48.2	9.2	A
9.3	23.0	23.1	A	9.3	11.4	22.6	A	9.0	1 1.1	40.5		8.7	35.1	8.8	A	9.4	55.3	0.0	
9.5	41.7	59.4		9.4	43.8	21.8	A	9.1	25.6	8.2		7.1	37.2	18.0	A	8.7	20 17.5	43.6	A
9.5	50.4	11.1		9.0	47.6	22.3	A	9.4	29.8	52.7	A	9.5	44.6	57.0		9.4	26.8	19.7	
9.5	33 6.5	1.1		9.1	48 12.9	19.4	A	8.8	39.8	51.9	A	9.0	47.2	35.3		9.3	37.0	59.9	
8.0	40.7	33.9	A	9.2	16.1	8.9	A	8.6	2 3.1	29.3	L	8.9	49.5	36.2		9.4	44.1	47.9	
9.2	34 37.0	9.2		9.5	33.4	40.4		9.4	6.0	55.6	B	9.3	11 2.8	23.0		9.4	21 3.8	4.2	
9.5	38.4	42.0		9.5	38.8	31.4		9.2	14.4	55.1	A	9.3	3.9	39.1		9.5	34.4	13.8	
9.0	49.2	9.4	A	9.2	58.5	45.9		9.5	14.9	4.3		6.2	18.8	8.1	A	9.0	46.5	47.0	A
6.3	35 10.2	37.4	B	9.4	59.7	56.1		8.8	16.9	8.1	K	9.4	52.0	44.2		9.5	57.4	19.0	
9.2	12.8	16.4	B	7.8	49 14.2	5.4	A	8.5	22.4	16.1	R	9.5	12 1.5	43.4		9.5	22 9.5	16.9	
8.8	19.6	37.1	B	9.0	15.4	45.1		8.6	24.5	52.9	A	8.9	4.2	2.0		9.5	15.0	42.7	
9.5	24.3	41.5		9.1	17.0	49.0		9.4	50.4	51.8	A	9.3	4.4	56.7		9.5	17.9	13.9	
9.4	55.1	0.2		9.2	17.5	0.2	A	9.5	3 4.6	36.6		9.5	29.5	12.1		8.6	21.0	48.8	A
9.1	55.3	9.5		9.4	21.0	26.5		8.0	17.4	34.1	A	9.5	41.3	8.4		8.4	23.5	12.3	L
9.4	56.4	26.0		9.5	32.8	0.9		7.6	29.8	7.0	K	9.5	43.9	50.5		8.6	23.7	1.4	L
8.3	36 2.9	21.0		8.2	47.7	37.8	A	9.1	36.0	50.8	A	8.5	48.0	11.1	A	9.4	37.0	20.2	
9.5	6.2	4.2		9.4	53.6	50.0		8.1	53.0	57.2	A	8.9	49.0	51.9	A	9.5	56.5	57.0	
5.5	21.2	10.6	G	9.4	50 0.5	20.0		9.5	4 9.1	33.2		8.6	13 8.9	59.1	A	9.5	23 12.3	14.3	
9.4	40.4	24.3	B	8.4	1.8	37.1	A	9.5	33.5	4.0		9.0	10.6	7.7		9.5	33.4	50.7	
8.8	45.2	26.0	A	9.5	17.9	26.1		9.4	49.3	4.6	A	9.4	41.9	6.7		7.5	24 2.0	14.5	L
9.5	49.8	25.3		9.5	51 11.7	16.0		9.5	49.3	20.9		9.0	45.7	36.7		8.3	10.0	35.7	
9.2	53.6	8.1		9.5	28.6	52.1		9.5	53.9	12.1		9.5	50.4	52.1		8.3	20.8	14.9	L
9.1	54.2	38.9	A	9.5	31.5	33.3		9.5	5 6.5	21.2	A	9.5	51.3	1.6		9.1	49.9	38.3	
8.9	37 1.4	33.5	A	9.5	51.9	18.8		9.5	7.2	40.8		9.2	59.9	12.6		8.6	54.7	0.4	K
9.2	29.7	58.7		9.3	52 22.7	29.6		9.5	47.0	9.3		9.5	14 1.0	20.7		6.5	25 12.1	26.6	A
9.5	57.0	4.6		9.5	41.4	9.6		7.9	47.3	1.9	A	9.1	9.2	28.0		9.5	20.3	4.0	
9.3	38 10.9	22.5		8.8	45.5	27.0		9.3	57.1	50.0	A	9.4	9.2	35.3		9.2	31.1	27.6	A
9.1	17.4	19.0		9.3	50.2	50.2		9.5	6 4.6	21.4		6.6	11.2	52.2	A	9.0	33.5	31.7	A
8.8	45.7	38.9	A	9.5	53 12.4	7.0		7.9	19.0	10.2	A	9.5	38.1	44.2		9.5	42.6	17.0	

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	20u	+45°			20u	+45°			20u	+45°			20u—21u	+45°			21u	+45°	
m	° ′ ″	′		m	° ′ ″	′		m	° ′ ″	′		m	° ′ ″	′		m	° ′ ″	′	
9.3	26 3.2	51.3		9.3	40 43.9	4.8		9.1	48 55.4	5.9		8.8	58 22.0	12.9	A	9.4	6 40.5	19.2	
8.7	19.8	6.8		8.7	48.7	40.0		9.2	56.5	13.0		9.5	30.7	34.7		8.1	54.9	6.2	K
8.8	23.1	48.5	L	9.5	50.3	59.1		9.2	58.9	0.4	B	9.5	48.4	19.6		9.5	56.3	13.4	
9.5	34.1	51.9		9.0	56.2	15.1	A	9.3	49 12.6	51.8		8.0	49.3	45.4	A	9.4	7 9.8	52.6	A
9.0	51.2	37.2	A	9.5	41 10.0	22.3		9.2	26.5	33.3		9.5	59 0.4	1.2		9.0	17.8	56.1	A
9.5	58.0	36.5		9.3	13.6	45.7		6.8	40.8	40.7	A	9.4	9.2	40.2		8.0	18.5	15.9	K
9.4	58.5	50.6		9.4	19.5	39.8		7.0	50 10.9	48.4	A	8.5	14.8	57.3	A	8.8	19.3	56.8	A
9.1	27 3.6	26.9	A	9.4	38.9	16.3	A	9.5	16.8	13.3		9.0	17.8	56.8	A	8.8	24.7	11.1	K
9.4	23.7	46.9		9.5	45.0	5.3		9.2	21.7	25.9		8.0	23.0	28.3	A	9.4	29.4	2.8	
9.1	33.6	32.8	A	6.4	46.7	59.9	A	9.2	22.3	4.5		9.2	23.6	33.0		9.1	30.6	38.1	A
9.4	35.7	5.4		8.8	56.5	31.3	A	9.5	33.8	57.0		9.5	32.5	5.1		9.2	41.0	10.5	K
9.0	46.0	10.7	A	9.4	42 8.2	52.5	B	9.1	48.2	42.0		9.5	46.1	37.7		9.0	44.9	40.2	A
8.6	28 6.9	7.0	A	8.7	9.5	39.2	A	9.4	55.8	3.7		9.1	51.5	57.9	B	9.5	45.7	4.1	
9.3	12.9	40.0	B	9.5	13.0	54.2		9.5	51 10.1	58.2		9.2	57.8	27.8	A	9.4	8 19.0	7.7	
9.5	18.3	32.4		7.0	22.8	2.9	A	9.0	10.6	42.1	A	8.4	0 1.5	58.1	A	9.3	22.2	21.9	
8.7	29 0.0	9.8	A	9.4	28.9	52.7		9.0	11.1	5.0		9.3	2.6	16.9		7.5	28.8	0.7	K
7.6	11.6	55.3	G	9.4	32.6	45.9		9.5	35.4	54.8		9.5	9.0	50.4	B	9.3	28.8	51.5	
9.5	36.8	4.9		9.4	37.8	7.9		9.3	37.2	33.6		9.1	9.5	11.5		8.3	46.5	40.0	A
9.3	53.7	1.0		9.2	38.8	8.5	B	9.3	39.4	48.0	B	9.1	13.2	44.7		9.5	57.4	20.0	
9.5	30 1.9	54.1		9.4	49.5	13.8		8.4	46.0	45.8	A	9.5	27.9	2.7		9.5	9 4.6	40.4	
9.3	9.5	33.7		9.5	52.6	35.4		9.0	52 2.8	58.8	A	9.0	40.5	6.2	A	9.5	10.0	57.9	
9.5	22.6	35.5		9.2	55.3	1.0	A	9.5	13.4	3.2		9.2	41.7	31.2	A	9.5	15.7	5.9	
9.2	23.4	35.0	B	9.4	43 5.8	34.4		9.2	13.9	23.5		8.4	47.7	8.2	A	9.5	19.9	48.8	
9.5	27.1	36.5		9.5	13.1	59.1		8.4	22.5	57.0	A	9.1	54.9	27.4	A	9.5	37.0	38.6	
9.3	31 1.5	28.8		9.5	13.3	8.7		9.1	25.2	32.4		9.4	59.5	54.7		9.1	52.5	0.4	B
9.1	8.6	50.2	A	9.4	17.1	46.4		8.3	41.6	27.1	B	9.3	1 24.0	16.5		9.1	10 0.1	43.2	
9.4	13.8	58.7		9.4	26.7	26.8		9.5	43.8	48.4		9.4	24.6	42.1		8.8	3.3	20.7	
9.4	31.1	47.0	A	8.5	30.4	6.8	A	9.5	54.6	11.3		9.3	27.6	44.3		8.9	5.4	13.4	
9.1	32 15.0	16.5	A	8.6	51.2	19.0		8.1	58.9	54.6	A	9.5	34.8	3.5		9.4	13.9	9.9	
9.2	23.8	37.5	A	8.5	56.7	5.6	A	9.1	53 24.2	25.8		7.0	43.7	5.8	A	8.0	14.7	49.4	A
9.4	33 13.9	40.6		5.6	44 1.3	34.7	A	9.3	45.7	16.3		9.2	45.0	38.7		9.2	31.1	49.8	B
9.5	17.2	12.8		8.6	18.0	58.3		7.4	52.8	41.5	A	9.5	47.3	56.2		9.3	35.9	40.8	B
6.7	34 31.6	9.5	A	9.5	27.6	30.0		8.1	54 3.9	52.6	A	9.3	48.0	59.5		9.5	36.2	17.7	B
8.5	58.5	16.2	A	9.5	30.9	40.7		9.5	11.2	10.1		9.2	58.4	42.5		9.0	40.4	48.3	A
8.4	35 7.6	29.5	B	9.5	46.7	28.1		9.4	37.3	2.6		8.8	2 8.3	35.8		9.4	43.0	43.4	
9.5	14.2	34.3		9.1	58.5	54.1		9.0	40.3	24.1		8.7	10.7	20.9	A	7.6	43.6	7.5	L
8.1	22.9	2.9	A	9.4	45 12.0	16.9		9.5	40.6	42.4	A	9.3	15.7	8.7		9.4	57.6	40.5	B
8.7	26.9	5.8	A	9.4	13.2	49.1		9.0	58.3	24.0		9.0	16.8	30.5		9.5	11 8.6	53.5	
8.3	36 6.2	16.6		9.5	25.5	52.4		9.5	55 27.8	27.0		9.5	20.7	49.5		9.5	17.1	17.8	
9.4	26.5	5.8		9.3	44.4	39.2		9.5	30.9	40.7		9.5	48.2	39.4		9.4	27.4	31.1	
9.5	55.0	3.2		9.5	56.9	52.6		8.7	50.4	49.6	A	9.5	53.6	14.2		9.0	42.1	18.0	A
8.6	58.8	29.5		9.4	58.5	41.8		9.3	51.9	45.9		8.6	58.4	51.4	R	8.7	58.5	55.3	
8.4	37 5.9	52.2		9.2	46 3.4	30.0		9.5	53.2	37.1		9.3	3 2.2	6.6	A	9.4	12 5.2	5.9	
9.2	20.4	48.3	B	9.4	12.0	7.4		5.7	56 7.1	35.3	A	8.8	37.3	34.7		8.0	6.8	28.1	B
7.6	27.9	18.9	A	9.1	25.5	43.1	A	9.3	14.1	14.1	K	8.6	54.3	24.3	A	9.4	9.3	34.2	
9.2	37.7	22.5		9.2	31.6	14.5		9.5	21.4	6.6		9.0	4 6.4	44.2		8.3	33.9	50.0	
8.9	38 9.8	18.6	A	9.5	47.8	52.9		9.5	37.7	2.0		7.2	24.2	9.0	A	9.5	55.8	15.4	
9.0	18.7	36.5	A	9.2	47 33.0	58.0		9.4	38.5	15.2		9.4	24.9	42.4		9.5	13 5.5	33.0	
9.1	28.0	21.9	A	9.0	35.4	54.7		9.2	47.3	5.0		7.5	33.3	34.5	A	8.5	21.7	46.9	
9.4	31.4	1.0		8.3	47.3	34.4		9.4	57 8.6	38.4		8.0	38.4	48.6	A	9.5	28.2	28.0	
9.5	45.2	3.4		9.1	49.8	18.2	B	8.0	29.9	18.5	B	9.5	5 3.5	27.5		9.5	30.6	37.5	
7.5	53.3	47.5	A	8.7	57.1	8.8		9.4	30.1	25.3		9.5	5.0	17.9		9.0	44.3	16.9	
9.5	59.4	39.6		9.3	48 0.2	15.8		9.5	34.0	5.4		9.4	11.3	3.0		8.9	59.8	56.7	
9.3	39 27.6	3.8		9.5	10.6	15.7		6.7	42.6	16.5	A	8.8	18.5	39.5	A	9.5	14 21.4	12.0	
9.5	46.5	0.7		9.5	15.8	35.5		8.9	42.6	45.1	A	9.3	36.0	27.0	A	8.8	28.9	11.2	B
8.8	40 10.2	13.6	A	9.1	23.8	15.8		9.0	48.2	27.0		8.2	40.3	30.6	A	9.0	55.9	3.4	
9.5	22.6	55.1		8.8	32.7	28.8	A	9.0	52.4	42.1	A	9.5	59.1	34.6		9.2	59.4	52.7	
6.8	29.1	49.7	A	9.5	33.5	32.5		9.0	55.5	27.7	B	6.5	6 4.3	5.2	L	9.0	15 4.5	12.9	
9.1	34.9	12.6	A	9.5	44.2	43.2		9.4	56.0	55.0		9.4	14.2	15.7		9.5	29.7	6.5	
9.0	42.6	49.0	A	8.0	49.5	27.3	B	9.4	57.9	26.0		9.1	30.4	56.9	A	9.4	40.8	59.4	

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	21ʰ	+45°			21ʰ	+45°			21ʰ	+45°			21ʰ	+45°			21ʰ—22ʰ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.7	15 49.2	44.2	A	7.5	21 18.3	14.9	K	9.3	33 56.1	7.3		9.1	42 41.5	46.7	A	6.9	51 24.9	54.2	B
8.7	57.2	6.6	A	9.5	27.5	55.3		9.5	34 11.0	14.4		9.4	42.5	33.4		9.5	32.0	15.5	
9.4	16 0.9	14.8		9.5	28.6	42.3		9.2	12.6	33.9		9.5	43 1.7	46.2		9.0	55.9	34.7	A
9.2	4.8	12.9		7.9	40.1	0.3	A	9.5	31.0	5.3		9.5	33.7	16.3		9.5	52 8.7	42.4	
9.5	21.0	4.4		9.0	25 8.3	41.7		8.5	35.5	37.1	A	9.5	38.0	22.9		9.3	21.8	45.2	
9.4	25.8	42.9		8.2	8.6	54.3	A	9.2	48.4	29.2		9.5	38.2	35.8		9.5	48.6	57.2	
9.5	36.5	58.1		9.3	23.8	38.3		9.5	49.1	57.1		9.5	47.5	16.6	B	9.5	53 2.5	51.8	
9.4	39.1	27.3		9.3	26.1	18.9		9.4	35 0.4	3.0		9.2	47.6	44.8		9.1	4.6	37.4	
9.4	52.2	6.7		9.0	40.2	13.3	B	9.2	19.1	13.2		9.4	47.9	48.1		9.5	24.0	40.3	
9.5	53.4	41.8		9.4	51.1	0.3		9.4	31.1	37.4		9.4	44 10.0	9.6		8.9	28.0	23.7	A
9.5	17 11.0	7.5		9.5	55.5	57.5		9.3	32.8	37.6		9.5	37.2	7.2		9.3	39.4	59.9	
9.5	19.0	32.2		9.5	26 3.2	34.2		9.2	37.3	47.4		9.5	39.6	55.1		9.5	56.5	33.7	
9.5	27.7	46.7	A	9.2	11.8	39.4		9.5	36 10.9	44.5		8.8	57.4	35.2	A	9.5	56.9	57.7	
9.5	29.1	23.5		9.5	36.1	53.2		9.2	14.9	0.9		9.2	59.4	32.6	A	9.2	54 29.1	3.4	
8.7	31.1	49.5	A	9.5	37.0	3.0		9.3	15.7	48.9		9.4	45 0.3	27.5		9.3	36.5	47.3	
9.4	37.8	8.5		9.5	49.3	16.7		9.5	23.6	5.7		9.1	9.6	0.7		9.4	46.6	58.2	
8.6	39.8	52.6	A	8.2	51.5	37.2	A	6.2	36.1	6.3	A	9.5	16.4	30.2		9.4	49.4	1.7	
9.3	51.0	30.9		9.3	54.7	35.5	B	9.5	36.5	25.9		9.4	20.0	9.6		9.5	59.7	5.1	
9.3	18 0.6	45.4		9.5	58.6	39.0		9.3	42.5	40.7		9.0	27.5	59.0	A	9.5	55 7.6	46.5	
8.9	2.1	57.4	A	9.5	27 2.0	32.5		8.3	45.8	37.0	A	9.4	29.5	55.7		9.5	9.7	11.9	
9.3	25.4	45.0		9.3	35.5	28.0		9.5	37 31.9	10.3		9.4	46 2.9	13.2		9.5	10.3	34.2	
9.5	48.0	45.7		9.5	40.0	48.7		9.4	52.8	28.0		9.5	5.9	6.0		9.0	33.3	39.3	B
9.5	49.5	23.2		9.5	48.0	49.9		9.5	38 15.7	21.6		8.1	8.4	31.0	A	8.8	34.9	39.4	B
8.7	54.8	55.5	A	6.5	51.3	12.7	A	9.3	29.5	40.9		9.3	9.7	52.5		9.1	56 11.3	28.7	
9.5	55.1	26.5		9.5	28 2.0	8.8		9.2	30.0	12.0		9.2	14.9	22.1	A	9.3	14.7	7.3	
8.8	19 6.5	18.1		9.3	17.7	8.3		8.3	46.7	47.7		9.1	25.0	33.0	A	9.5	22.7	4.6	
9.5	30.4	11.3		9.4	52.3	42.0		9.4	56.0	30.7		9.3	25.6	43.4		8.8	23.5	17.2	K
9.4	32.6	0.6		8.4	54.4	21.0	B	9.5	57.5	41.4	B	9.3	37.4	31.6		9.3	31.4	42.2	B
7.5	34.9	52.2	A	9.5	58.2	51.0		9.5	39 2.8	41.8		9.4	54.5	59.9		9.1	39.5	49.2	
9.2	43.5	40.7		9.3	29 0.7	49.5		9.5	19.6	10.0		9.0	47 21.2	52.2		9.5	44.2	9.2	
8.0	20 0.7	25.9	B	8.6	1.0	9.9	A	8.2	23.5	52.9	A	9.3	28.9	17.4		8.5	52.6	30.8	
8.9	12.6	51.3	A	9.0	2.4	17.4		9.4	38.0	8.7		9.3	30.5	47.0	B	9.4	57 20.8	17.7	B
9.0	20.6	38.9		9.3	11.8	22.7	B	9.0	41.7	4.4		9.5	45.7	40.4		9.5	58.5	25.5	
9.5	27.0	57.3		9.5	24.0	33.5		9.2	44.7	51.4	A	9.5	46.8	52.3		8.0	58 0.6	53.1	A
9.4	27.4	42.5		9.5	41.0	54.9		9.4	56.5	7.0		8.7	48 27.1	35.8	B	9.5	9.4	41.3	
9.5	33.2	54.3		8.9	41.9	14.9	A	9.4	56.8	28.2		8.5	32.3	54.7	A	9.1	12.0	2.4	
9.1	35.3	44.6		8.7	30 12.8	12.4	A	9.5	40 2.4	57.3		9.2	35.0	59.0		8.1	24.8	39.0	A
9.4	40.7	56.3	B	9.5	31.0	39.7		8.7	5.7	12.1	A	9.5	48.1	30.6		9.3	34.5	9.8	
9.5	52.4	24.0		9.5	33.0	47.2		8.0	8.3	5.8	A	9.4	51.1	25.4		9.5	38.7	31.4	
9.5	53.9	15.9		9.5	35.4	5.6		8.7	13.2	14.1	A	9.4	53.6	10.2	B	9.5	45.0	41.1	
9.5	21 15.5	18.2		8.7	36.5	58.0		9.4	24.1	56.9		8.1	49 8.2	6.4	A	9.5	51.8	41.7	
9.0	30.5	59.3		9.5	45.7	22.2		8.5	44.4	47.1	A	7.9	14.3	33.6	A	9.4	55.2	43.2	
9.5	40.0	19.2		9.5	46.0	6.3		8.6	45.9	59.4	A	9.3	16.8	55.7		9.5	59 1.5	49.5	
9.5	50.0	7.1		9.5	47.7	8.0		9.5	55.0	19.9		9.3	24.2	5.9		9.5	7.5	51.0	
9.5	53.4	35.1	B	9.1	31 17.7	38.5		8.4	57.1	4.8	A	9.0	43.4	30.7	A	9.2	7.7	50.7	
7.6	22 10.8	47.5	L	9.4	20.0	55.0		9.5	41 6.8	54.4	B	9.1	43.5	48.0		9.5	8.5	50.2	
9.1	13.5	20.5	B	9.5	56.1	48.0		9.5	18.5	48.8		9.0	46.7	13.4	B	9.5	11.7	43.3	
9.3	23.6	19.1		9.4	32 7.0	9.2		9.4	21.5	55.5		9.2	48.8	40.7		9.5	13.0	41.2	
7.1	35.9	56.0	A	8.8	9.6	22.3		9.5	23.0	48.4		9.5	53.5	23.3		9.5	23.0	49.4	
8.1	41.5	9.4	B	9.2	14.2	33.3		9.2	32.7	3.0		9.0	50 11.3	13.2	K	9.5	25.4	45.4	
8.5	43.3	46.9		8.9	20.4	31.9		9.5	41.6	43.7		9.3	25.4	22.9		9.5	25.8	43.4	
9.0	51.0	37.0		9.5	44.5	32.3		9.5	43.4	32.1		9.5	25.9	6.4		9.3	30.5	46.2	
9.4	23 11.9	33.5		8.1	33 0.2	37.6	L	9.5	46.0	24.7		9.5	34.0	9.7		9.5	32.4	41.3	
9.3	26.3	29.9		9.5	9.5	55.2		8.8	49.1	18.5	A	9.3	43.0	46.9		9.5	35.1	49.3	
9.2	43.5	9.5	K	9.0	29.5	20.0		8.8	50.2	7.8	A	9.1	44.4	19.6	A	9.4	38.0	43.0	
9.4	50.7	51.2		9.3	40.4	27.2		9.5	59.2	57.0		8.7	52.4	27.8	A	9.5	38.3	46.2	
9.4	24 2.7	50.4		9.5	42.1	51.2		9.4	42 12.3	24.5		9.4	58.5	45.8		9.5	51.6	2.7	
5.4	5.8	54.3	A	7.3	47.4	31.1	A	9.4	27.9	28.0	B	9.1	51 14.9	17.4	A	9.5	53.9	51.1	
6.7	16.0	47.6	A	9.2	49.6	45.4		9.5	28.1	12.0		9.5	16.3	25.8		8.6	57.2	35.1	
7.4	16.4	29.9	B	8.7	55.4	36.3	A	7.8	31.3	8.2	A	8.5	18.7	8.2	A	9.1	0 1.0	59.9	A

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	22u	+45°			22u	+45°			22u	+45°			22u	+45°			22u	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	0 12.0	45.0		9.2	10 39.7	34.5		9.4	19 4.7	27.7		7.9	27 10.2	22.4	A	8.4	38 30.5	24.5	
9.3	42.5	47.5		9.3	56.0	28.3		9.4	6.4	37.9	B	9.4	17.0	7.3		9.2	44.6	28.3	
9.5	1 11.8	16.5		9.2	11 4.4	29.8		9.4	8.3	29.4		7.0	28.8	49.4	A	9.2	54.2	55.7	
9.5	13.5	37.5		9.5	8.7	1.8		9.5	9.2	21.5		9.0	34.5	21.7	A	9.4	39 1.8	1.8	
9.5	17.5	39.1		9.4	10.0	37.9		9.5	9.7	23.2		8.7	55.4	10.5	A	9.4	21.5	31.1	
7.9	21.4	39.4	A	8.7	12.5	49.2		8.0	14.1	14.5	A	9.4	28 33.5	11.2		9.5	43.8	37.7	
9.5	22.1	52.3		9.2	49.7	37.5		8.6	23.9	46.2		9.5	39.5	53.0		6.5	40 2.3	27.4	A
9.3	49.3	29.4		9.4	54.6	54.7		9.5	44.2	30.5		9.5	29 21.7	3.8		9.5	18.7	36.0	
9.3	51.6	38.8		9.2	59.4	44.3		9.5	54.6	14.3		9.5	24.2	25.8		9.5	35.0	49.6	
9.5	2 0.2	23.5		9.5	12 7.3	28.9		9.5	20 4.5	41.0		9.5	27.1	34.8		8.9	46.0	15.3	
9.5	26.0	8.1		9.1	18.0	16.1		9.5	8.7	18.1		9.5	44.0	31.7		7.5	41 3.5	26.9	A
8.5	29.1	48.7	A	9.5	25.1	39.6		9.5	16.6	9.5		9.1	56.4	33.0		9.2	7.8	46.3	
6.2	50.2	1.9	K	9.2	27.1	12.2	B	9.0	18.5	48.8	A	8.3	30 2.9	46.4	B	9.5	13.9	35.0	
9.5	3 16.5	28.0		9.5	31.6	45.3		9.5	20.3	28.0		9.5	6.6	17.7	B	8.2	16.2	59.1	B
9.3	17.2	40.5	A	9.5	36.4	9.5		7.5	23.5	49.8	A	9.3	15.3	33.5		9.5	18.0	2.5	
9.1	50.7	4.0		8.7	40.3	33.9	A	9.0	25.2	26.1	A	8.5	32.3	29.0	A	9.5	23.3	23.7	
9.5	52.9	32.0		9.5	47.2	20.4	A	9.4	40.0	51.0		9.4	36.0	35.7		8.0	34.3	40.6	A
9.5	56.4	42.5		9.5	56.7	55.0		9.5	48.5	37.5		9.0	48.1	12.2	A	8.9	46.0	29.0	A
8.8	4 8.8	8.9		8.3	13 1.2	4.6	A	9.5	50.0	15.6		9.5	31 5.0	34.0		9.4	58.5	29.8	
9.1	16.7	33.8		7.3	4.3	16.2	A	9.3	53.2	17.6	B	9.5	15.1	12.2		9.1	42 2.6	53.7	
9.5	34.3	35.6		9.4	12.5	47.5		7.0	55.9	2.8	A	9.2	43.0	22.3		9.1	5.5	19.2	
9.5	45.2	45.5		9.5	26.5	5.8	B	9.3	21 1.3	3.7		7.0	59.0	4.8	A	8.5	26.3	36.1	A
9.5	53.3	0.3		8.2	27.1	30.8	A	9.5	15.8	41.7		9.1	32 1.5	47.1		9.5	34.6	34.7	
9.5	5 5.5	47.8		9.4	14 3.0	3.1		9.2	19.1	35.5		8.0	8.0	57.6	L	9.3	44.0	46.7	
9.3	15.3	22.9		8.8	6.9	40.4	A	9.5	19.5	59.3		8.8	30.0	47.2	A	8.5	59.0	8.1	A
9.4	21.4	28.8		9.2	6.9	58.3	B	9.4	33.9	4.4	A	9.3	39.1	44.9		9.2	43 7.8	0.8	A
9.0	31.5	52.3		9.2	12.0	30.3		9.5	49.1	46.1		9.4	52.2	43.0		9.4	14.5	16.8	
9.4	42.8	11.5		9.5	14.1	58.1		9.5	57.0	0.6		9.0	33 2.5	15.5		9.5	21.2	50.4	
9.0	51.6	52.8		9.3	17.1	35.7		9.0	22 2.0	10.4	A	8.5	19.7	17.6	A	9.4	31.5	33.9	
9.4	52.6	57.1		8.0	28.0	41.2	A	8.9	2.6	54.2		9.5	26.8	2.5		9.5	45.2	25.0	
9.5	6 1.7	4.0		8.7	36.5	7.5		8.5	11.5	33.2		9.1	48.3	21.5		9.5	48.7	12.7	
9.5	44.8	52.0		9.4	44.3	30.1		9.5	30.1	25.7		9.5	34 22.5	37.7		9.5	44 38.2	39.2	
9.5	55.5	11.5		7.0	52.2	19.7	L	8.2	42.7	53.5	B	8.7	34.5	45.4		9.5	45 21.7	34.2	
9.5	56.0	22.8		5.0	15 2.7	47.9	A	9.1	52.0	13.6		8.7	39.8	26.9	A	7.0	27.6	58.0	A
9.5	7 0.5	39.8		8.5	11.7	24.8		9.5	23 2.7	51.0		9.1	47.6	24.9		9.2	37.8	36.0	B
9.5	31.7	32.9		9.4	12.0	5.6		9.5	10.9	50.3		9.5	47.9	6.9		8.9	42.5	2.3	B
9.5	44.4	11.5		9.4	15.6	54.1	A	9.4	38.5	10.6		8.9	49.6	53.3		9.5	46 0.0	15.5	
8.7	49.2	28.7	B	9.5	29.7	50.9		8.0	45.6	0.3	A	8.1	35 12.3	33.1	A	6.5	24.5	47.3	A
9.5	52.0	39.6		9.5	36.2	19.2		9.5	56.1	15.7		8.7	18.9	41.7	A	9.4	43.2	54.2	
8.9	59.6	43.2		9.4	16 0.5	50.9	A	7.5	24 8.6	40.6	A	9.5	37.6	44.3		9.5	47 0.9	2.2	
9.4	8 10.0	15.2		8.4	4.2	27.4		9.5	35.0	15.6		9.2	38.5	17.9		9.0	38.1	30.3	A
8.1	17.2	59.3	A	9.3	7.2	5.3		9.5	38.1	20.2		9.5	55.5	34.3		8.7	49.2	21.8	
9.5	29.3	36.8		8.6	8.6	12.3		8.5	39.0	36.2	A	9.5	56.5	45.7		9.2	48 16.0	35.7	
9.1	31.1	13.9		9.4	11.4	52.2		8.0	40.6	46.8	A	9.5	36 6.0	50.4		9.5	39.7	15.6	
9.1	34.5	39.6	B	9.4	18.5	55.2		9.5	25 0.3	19.9		9.5	9.9	56.4		9.5	39.8	6.8	
9.3	41.0	31.3		9.5	32.6	10.5		9.5	12.5	45.3		9.5	12.4	12.5		8.7	46.5	42.5	
9.2	48.7	38.5		8.9	41.3	2.8		9.4	21.4	56.9		9.5	13.0	50.7		9.5	47.0	48.8	
9.0	56.0	9.7		9.4	54.1	53.8		9.5	22.5	19.7		9.3	16.9	4.6		7.8	48.4	36.3	L
9.5	57.0	9.9		9.5	17 2.4	49.6		9.4	31.5	54.5		9.5	23.0	58.9		8.5	49 4.9	53.4	
9.2	59.8	51.0		8.1	5.2	57.9	A	9.5	45.9	55.3		9.5	25.2	15.7		9.5	25.3	7.2	
9.1	9 18.3	42.2		9.5	31.1	5.2		9.5	26 1.9	34.8		9.5	37 1.6	22.9	B	9.5	28.7	24.3	
9.3	27.2	24.6		8.0	31.7	37.2	A	9.5	7.1	11.5		6.8	11.6	15.6	K	9.5	30.5	17.7	
8.8	29.0	9.9	A	8.1	34.2	15.2	A	9.0	12.4	4.8	A	9.5	14.3	57.2		8.0	35.2	55.1	L
8.6	30.9	30.1	A	9.5	35.1	55.1		8.3	13.3	48.9	A	9.5	28.5	28.7		8.4	41.8	1.2	A
9.1	32.5	0.2		9.1	37.4	2.5		9.5	30.6	37.2		9.0	30.0	8.8		9.3	55.4	35.1	B
9.5	10 11.2	7.1		9.3	48.9	26.7	A	9.5	34.0	31.5		9.5	50.5	40.3		9.3	57.8	40.3	
9.2	15.0	24.7		9.5	18 2.6	37.1		9.2	36.5	50.8		8.2	51.9	51.6	B	9.5	50 19.5	8.0	
9.0	15.6	17.9	A	9.1	45.5	5.3		8.0	49.0	9.6	A	9.2	38 0.3	36.0		9.5	36.6	59.5	
9.5	18.7	56.8		7.8	55.2	2.9	A	8.0	50.6	19.7	A	9.3	16.5	27.3		9.4	48.4	11.9	B
9.3	23.6	20.2	A	9.4	19 4.2	26.0		9.4	27 8.6	57.5		9.1	29.4	41.7		9.5	51 2.3	13.0	

4101—4160				4161—4220				4221—4280				4281—4340				4341—4400			
	22ᵘ—23ᵘ	+45°			23ᵘ	+45°			23ᵘ	+45°			23ᵘ	+45°			23ᵘ	+45°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	51 5.5	46.8		7.8	3 58.3	35.0	A	9.5	19 6.2	1.1		9.4	29 55.0	16.0		9.4	42 57.5	29.9	
9.5	52 6.8	7.5		9.4	4 19.5	8.5		9.4	40.2	24.0		8.0	30 3.1	28.9	A	9.5	43 12.0	17.3	
9.5	8.5	20.8		8.5	36.2	55.2		9.5	44.1	59.3		3.5	29.3	40.6	A	9.0	17.5	53.1	A
8.0	21.0	34.6	L	9.5	5 33.4	22.1		9.5	58.6	33.2		9.5	35.2	58.0		9.5	34.0	51.2	
9.1	25.7	57.1		9.5	35.7	33.9		8.7	20 1.1	59.1		8.5	35.7	18.5	A	9.5	44 35.2	28.6	
9.0	28.9	29.1		9.5	57.4	58.0		9.5	3.7	18.5		8.0	42.4	16.3	A	9.2	35.3	13.5	
8.9	44.5	36.9		8.5	6 5.5	49.4	A	9.5	4.5	23.4		9.5	45.5	31.1		9.5	45 17.6	0.5	
9.5	55.3	1.8		9.0	13.1	50.5		9.5	30.9	58.2		6.8	50.4	23.9	B	9.2	35.8	40.7	A
8.4	53 7.6	16.7	A	8.8	25.0	35.0		9.5	43.3	35.4		9.1	31 9.6	58.2		7.7	36.9	41.8	A
9.4	23.5	24.2		9.5	25.9	46.1		9.5	53.9	54.5		9.5	30.5	48.6		9.4	46 7.7	19.1	
9.5	28.6	40.6	B	9.5	32.0	3.1	B	9.5	57.1	20.7		9.2	59.8	20.6	A	8.4	27.9	59.1	A
9.4	28.6	8.6		9.5	32.5	29.2		9.4	21 3.5	9.6		9.0	32 5.1	37.8		8.8	29.5	38.2	A
9.4	50.9	54.2		8.5	39.4	16.0	K	9.5	28.6	6.6		8.7	21.5	50.4		9.3	42.2	8.3	
8.5	54 5.0	15.3		8.2	7 12.5	53.9	A	8.3	33.1	48.5	B	9.2	23.3	30.4		9.3	42.5	0.7	
8.8	8.7	39.4		8.0	25.2	20.5	K	8.9	35.7	57.9		8.9	30.7	12.9	B	9.5	58.4	33.7	
9.5	17.2	47.8		9.5	45.9	14.9		9.2	40.3	9.2		9.0	34.3	51.3		9.5	47 3.5	14.0	
8.8	20.6	43.7		9.5	8 14.5	44.7		9.5	50.0	28.7		9.5	40.9	26.0		8.7	12.5	58.4	A
9.5	31.8	3.8		9.5	17.0	9.4		8.9	58.5	43.2		9.5	47.3	59.4		8.7	15.2	8.4	A
8.5	52.4	51.5		7.1	19.7	45.0	G	9.5	22 18.0	7.0		9.0	33 9.7	55.1	B	9.5	52.0	12.9	
9.3	55 7.9	58.0		9.4	26.1	44.7		9.1	31.4	47.6		9.4	49.1	32.4		9.1	48 11.9	15.1	
9.5	13.3	6.5		9.5	32.4	50.7		7.0	32.1	40.0	G	7.0	34 1.5	25.1	A	9.5	17.4	56.9	
9.3	33.3	45.1	B	9.0	46.7	47.2	B	9.0	23 11.0	5.0		8.7	19.1	49.1		9.5	18.5	13.1	
9.5	41.5	2.8		9.0	9 6.5	49.5		8.0	13.8	40.1	G	9.4	30.8	57.7		6.7	19.5	33.1	B
9.5	56 8.5	57.4		9.5	10 24.0	46.5		9.5	19.6	51.2		8.5	38.2	2.1		9.5	32.3	59.9	
9.2	15.3	35.7		9.5	35.9	42.6		9.1	43.5	40.0		9.5	54.0	36.1		8.5	44.5	58.9	A
8.6	17.8	23.6		9.3	11 14.2	6.5		8.0	46.0	21.3	L	9.5	35 13.5	49.5		8.0	49 4.3	15.7	A
9.5	19.0	58.8		9.5	32.0	41.1		9.1	24 12.9	14.5		9.5	53.6	2.9		8.2	6.8	11.8	A
9.5	55.0	8.4		9.5	33.3	33.2		8.8	14.1	25.9		9.5	36 27.2	14.9		9.2	26.6	51.6	
8.4	57 11.5	33.0		8.4	38.2	59.5		9.5	32.0	1.1		9.5	28.9	59.7		8.0	40.3	48.3	A
9.5	28.7	9.6		8.4	47.3	57.7		9.5	47.6	42.0		9.4	33.6	43.0		9.2	51.7	7.8	
9.3	33.7	9.7		8.7	47.9	53.9		7.8	59.9	58.8	A	8.6	39.4	7.7		9.5	53.3	15.4	
8.2	40.9	51.4	A	9.3	12 8.9	6.7		7.0	25 1.3	6.0	L	8.5	50.4	7.8		9.3	59.5	41.5	A
8.5	51.2	46.7	A	9.1	24.0	58.2		9.5	4.0	20.2		9.2	55.2	27.5		9.0	50 1.8	32.5	
8.5	55.0	32.9		8.8	25.7	36.7		9.5	4.0	18.8		8.5	37 2.7	16.6	A	9.5	35.2	26.6	
9.5	59.1	54.0		8.5	35.2	22.5		9.4	33.1	25.8		9.4	21.5	21.5		9.4	40.7	11.3	
8.4	58 13.6	14.2		9.5	13 18.5	37.0		9.2	39.3	44.8		7.3	24.3	34.1	S	8.2	51 6.5	29.1	A
9.4	37.5	11.1		9.0	24.7	8.3		9.2	42.6	59.7		7.5	31.7	27.7	P	8.9	7.0	57.1	A
8.0	57.2	55.4	L	9.1	48.2	22.6		9.2	51.7	21.2	B	9.2	49.6	16.6		9.2	14.4	54.8	A
8.8	59 3.2	30.7	B	9.5	14 19.0	17.4		7.0	57.2	19.5	L	9.2	38 20.2	10.9		9.0	19.8	21.2	R
9.0	21.4	18.7	A	9.0	23.9	4.7		9.2	59.5	17.2		9.5	51.0	13.3		9.3	25.9	9.5	
9.5	32.9	54.3		9.3	31.1	8.7		9.4	26 19.2	55.5		5.2	53.2	36.7	G	6.5	27.5	37.0	A
9.1	45.2	15.4	B	9.5	48.5	59.6		7.0	49.7	52.8	A	8.8	59.7	33.3		9.5	48.3	22.5	
9.5	0 7.8	18.4		9.5	15 7.4	45.7		9.5	27 4.6	22.7		8.6	39 36.8	51.4		9.5	52 21.7	23.4	
9.2	27.6	20.9	A	8.9	35.1	44.3		9.5	5.5	25.9		7.7	45.2	24.5	L	9.5	23.2	7.7	
9.5	29.0	5.9		9.5	52.6	51.2		9.5	25.3	2.3		8.0	40 24.5	12.9	A	9.1	26.7	22.9	
9.1	33.5	21.0	A	9.5	16 42.5	12.2		9.5	26.9	56.8		9.5	28.7	46.0		9.0	47.8	44.1	
6.5	41.9	18.0	A	9.4	48.5	43.7		9.5	40.7	50.0		9.4	48.2	8.6		9.5	49.3	57.1	
9.4	48.8	38.0		8.1	49.0	34.5	A	9.5	44.6	46.2		9.5	48.2	8.0		9.4	52.8	1.0	
5.5	1 2.9	36.4	A	9.2	17 5.0	35.9	A	9.1	45.3	17.0	A	9.5	52.7	3.7		9.2	53 0.6	43.8	
9.4	28.5	56.5		8.4	21.0	11.4	A	9.4	51.2	19.2	B	8.5	57.2	4.9	B	9.5	27.0	53.9	
9.3	34.6	34.4	B	9.4	36.3	38.9		9.3	54.6	15.1		9.4	58.0	57.0		9.1	29.8	45.2	
9.2	54.5	49.8		9.4	39.7	32.0		9.0	55.5	19.0	B	9.5	41 8.5	12.5		9.5	52.6	27.4	
9.1	2 11.3	59.3		9.4	41.2	35.4		9.0	28 9.7	32.6	B	9.5	8.5	53.3		8.2	57.2	55.5	A
9.3	13.9	40.6		9.2	42.7	56.6		9.5	18.2	37.1		9.5	23.0	45.5		9.4	54 16.8	50.0	
9.5	27.5	38.9		9.5	46.9	53.2		8.9	38.1	31.2	B	8.5	25.1	27.1		9.4	26.9	50.0	
8.9	31.0	29.4	B	9.5	55.8	52.1		9.5	29 15.9	55.0		9.3	42 20.0	55.5		9.0	34.8	28.3	
9.1	3 29.7	13.8	A	9.5	57.3	49.9		9.5	24.5	39.9		8.5	21.3	29.8		9.3	48.1	47.0	A
9.5	32.2	21.1		9.0	18 34.7	21.6		9.5	45.7	56.5		9.4	25.1	59.5		9.4	49.3	8.1	
9.2	40.6	11.9	A	9.0	50.4	39.1		9.5	53.0	0.2		9.5	45.4	13.6		9.4	55 26.7	55.5	B
9.5	47.4	7.3		9.5	19 2.4	46.2		8.5	53.3	23.5	A	9.5	53.1	26.1		9.5	42.3	13.3	

4401—4404			
	23h	+45°	
m	′ ″	′	
8.7	55 42.6	5.8	A
9.5	56 32.8	38.0	
9.5	51.5	36.3	
9.5	57.1	14.0	

4405—4408			
	23h	+45°	
m	′ ″	′	
8.9	57 17.9	47.6	A
9.3	29.3	21.1	
9.4	56.6	9.3	
8.3	58 2.0	0.6	B

4409—4412			
	23h	+45°	
m	′ ″	′	
9.5	58 4.8	26.7	
8.3	5.5	50.4	A
9.2	27.8	29.1	
9.5	32.5	50.0	

4413—4416			
	23h	+45°	
m	′ ″	′	
9.2	58 35.6	7.4	
9.0	45.3	13.3	
9.1	59 8.8	40.4	
9.5	15.3	51.8	

4417—4418			
	23h	+45°	
m	′ ″	′	
9.1	59 32.9	20.5	
7.7	43.4	56.2	L

Zone +46°

1—40			
	0h	+46°	
m	′ ″	′	
9.1	0 5.6	30.9	
9.3	10.5	51.4	
9.4	15.0	1.2	
9.2	16.0	48.0	A
9.5	50.6	44.7	
9.4	1 3.0	15.4	
9.5	31.4	5.9	
9.5	36.0	27.2	
9.1	2 7.5	13.4	
9.2	30.7	8.8	
9.1	36.0	46.8	
9.4	54.0	14.0	
9.2	3 7.6	14.0	
9.3	13.5	51.5	
9.2	14.4	59.0	
9.3	26.8	54.6	
9.3	55.0	20.8	
9.4	4 3.2	44.0	
9.2	26.7	42.0	
7.2	34.0	42.6	L
9.4	37.5	8.0	
8.8	5 37.0	59.0	B
9.5	48.5	55.5	
9.5	50.7	46.8	
9.0	6 1.5	28.5	
8.0	2.7	23.2	B
8.3	29.2	8.5	A
8.9	29.5	17.1	
9.2	47.9	50.5	
9.5	7 2.1	4.5	
9.4	14.0	37.8	
9.1	14.6	2.5	A
9.2	23.0	31.4	
9.4	29.3	51.1	
9.4	32.8	49.0	
8.8	33.0	27.4	L
8.5	39.9	35.3	L
8.2	42.9	5.5	B
9.5	56.5	35.7	
9.5	8 10.3	18.6	

41—80			
	0h	+46°	
m	′ ″	′	
9.5	8 30.9	24.3	
9.5	53.3	0.3	B
8.5	9 8.1	28.8	L
8.9	13.3	26.1	
9.5	40.1	5.8	
9.5	40.2	56.9	
9.5	47.5	55.3	
8.9	50.8	15.5	
9.3	10 31.0	29.2	
9.0	33.1	34.4	
9.1	54.0	53.9	
8.9	11 7.0	51.7	A
8.8	41.5	33.2	A
9.3	44.0	24.3	
9.4	12 26.9	56.1	
9.5	45.6	3.2	
9.4	49.2	58.3	
9.5	13 3.5	24.6	
9.5	13.8	56.0	
9.4	16.2	13.4	B
8.8	18.0	48.5	A
9.4	46.0	21.4	
9.5	49.3	12.6	
9.5	14 39.5	35.4	
9.5	54.6	56.3	
9.4	15 28.0	23.1	
8.3	31.5	27.9	
9.5	39.0	20.6	
8.5	41.6	9.6	
9.5	59.0	54.2	
9.5	16 5.8	54.5	
9.5	17 7.6	2.6	
9.4	31.4	0.4	
8.8	35.8	13.9	B
9.5	18 18.0	11.4	
9.5	20.4	4.0	
9.5	44.2	35.1	
7.8	54.2	16.6	A
9.5	57.6	17.3	
9.3	19 34.1	3.0	

81—120			
	0h	+46°	
m	′ ″	′	
9.3	19 45.9	15.6	
9.2	52.0	0.5	
9.5	56.7	37.8	
9.4	20 6.8	3.1	
9.5	38.7	43.7	
9.5	39.0	10.2	
9.5	41.1	59.5	
8.0	44.1	54.4	A
9.5	21 23.2	23.6	
9.5	29.7	51.4	
8.8	48.9	41.0	A
9.5	22 9.7	45.5	
9.5	19.8	54.6	
9.5	55.2	37.1	
7.4	55.7	44.1	A
9.5	23 33.0	51.4	
9.5	51.8	14.0	
9.4	53.6	56.5	
9.5	24 14.7	53.5	
8.8	16.8	37.2	A
7.5	19.9	19.5	A
9.5	25 1.0	32.3	
9.3	14.4	48.6	
9.1	15.7	20.2	A
9.5	32.5	58.5	B
9.2	33.6	7.6	
7.9	33.8	51.4	L
9.5	50.7	31.9	
9.5	51.1	37.5	
9.0	26 14.6	55.0	
8.3	35.7	9.4	
9.3	42.4	43.7	B
9.0	59.9	50.3	R
9.5	27 21.6	58.1	
9.4	28 25.4	43.2	
9.3	25.4	8.1	
9.5	36.3	44.9	
9.0	29 4.7	9.0	A
9.5	10.9	28.5	
9.0	11.7	23.4	

121—160			
	0h	+46°	
m	′ ″	′	
9.2	29 19.4	8.3	A
9.5	32.7	53.3	
9.5	40.4	15.7	
7.3	56.2	43.4	A
7.2	59.9	36.5	A
9.3	30 21.2	23.7	
9.5	33.6	50.1	
9.5	41.5	47.4	
7.0	47.4	9.5	A
9.5	31 9.8	46.4	
7.7	32 16.2	26.9	F
9.5	20.5	3.2	
9.5	33.4	50.8	
9.5	34.2	45.2	
9.4	39.6	51.0	
8.3	33 8.9	11.1	A
9.5	25.1	9.4	
8.5	40.0	38.8	
9.2	56.2	10.4	
9.5	34 1.4	43.4	
8.9	6.4	10.7	A
8.6	24.7	26.2	
9.4	47.3	48.8	
9.4	55.2	33.4	
8.9	35 19.7	38.6	
4.5	28.6	14.7	G
9.2	38.7	57.9	
8.3	36 2.4	9.9	G
9.4	26.4	47.3	
9.4	36.9	49.7	B
9.1	41.9	53.8	B
9.4	51.6	30.2	
9.5	57.7	45.1	
9.5	37 9.0	1.4	
9.5	23.3	17.6	
8.7	25.5	57.9	A
9.4	29.6	13.6	B
9.1	36.3	49.2	
9.5	38.5	20.0	
9.4	49.5	52.5	

161—200			
	0h	+46°	
m	′ ″	′	
9.5	38 7.7	32.0	
9.1	11.3	27.1	
9.2	24.9	14.2	B
9.3	34.2	33.9	
7.0	34.8	7.0	G
9.3	59.0	37.8	
9.5	39 6.0	1.0	
8.8	21.7	31.0	
9.5	40 7.3	18.0	
9.3	9.5	32.4	
9.5	12.8	24.0	
9.5	14.9	22.0	B
9.5	20.0	13.0	
9.3	41 2.4	50.9	
9.0	18.7	33.3	
6.5	32.1	58.3	G
9.5	55.2	53.8	
9.1	42 31.1	4.6	
9.4	35.7	17.5	
9.4	42.3	28.5	
9.5	43 39.0	42.4	
9.3	51.7	55.6	
8.5	54.2	49.3	A
9.5	44 5.0	49.5	
9.5	14.3	22.3	
9.1	20.9	32.3	B
8.8	43.1	59.8	A
9.5	48.0	0.4	
7.9	48.2	19.5	L
9.3	45 1.0	30.7	
9.3	16.3	51.2	
9.5	36.9	42.8	
8.5	39.4	3.5	B
8.5	43.4	18.9	
9.5	46 1.2	27.1	
9.4	28.9	44.4	B
9.5	55.4	34.0	
7.5	58.6	6.3	G
9.2	47 28.4	55.5	
9.4	31.5	12.2	

201—260				261—320				321—380				381—440				441—500			
	0ʰ	+46°			0ʰ—1ʰ	+46°			1ʰ	+46°			1ʰ	+46°			1ʰ	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.0	47 33.7	36.5	A	8.6	58 52.2	39.9	B	9.5	9 52.4	59.8		8.8	24 12.3	50.9	A	9.1	36 39.6	19.8	
7.5	40.9	6.2	A	9.1	59 9.2	35.6		9.5	10 59.3	27.6		9.3	56.8	9.1		9.0	54.6	5.2	
8.6	50.8	20.8	A	9.1	13.5	27.5		9.5	11 18.2	13.1		9.3	59.5	18.0		9.5	37 11.2	15.3	
9.5	53.7	28.1		9.2	19.5	51.6		8.3	26.5	32.8		9.5	25 20.0	30.5		9.5	12.9	43.6	
9.1	48 27.2	14.6		9.3	24.0	46.5		9.5	54.6	0.6		8.9	26 5.4	11.7	B	9.4	19.5	1.1	
9.1	49 11.4	11.8		7.5	28.8	4.0	A	9.5	12 0.7	21.8		9.4	13.5	18.0		9.5	58.2	22.0	
8.9	16.7	45.1	A	9.5	29.1	38.9		8.2	14.9	17.2	A	9.4	31.9	1.5		9.0	38 14.3	48.2	
9.5	24.3	53.7		9.5	32.8	1.3		9.5	17.6	53.0		9.0	45.5	37.7		8.8	45.5	48.5	
9.3	35.2	54.6		9.5	47.4	19.2		9.5	38.4	2.1		8.6	48.3	8.8		8.4	58.2	27.9	
9.2	39.0	41.6		8.7	0 23.6	15.7	A	9.5	40.5	33.2		9.5	58.4	5.0		9.3	39 7.5	2.0	
7.9	44.2	44.0	A	9.1	23.7	26.7		9.5	41.1	40.4		8.8	59.4	32.4	B	9.5	38.8	3.0	
8.5	50 8.5	25.5		9.5	41.1	23.0		9.4	54.7	49.1		9.2	27 8.4	49.3		9.5	54.8	59.3	
9.4	9.4	0.6		9.5	51.2	47.3		9.5	56.3	0.4	B	7.0	18.2	21.9	G	8.8	40 7.2	50.0	
8.6	13.1	14.8	B	9.2	56.0	11.3		7.7	13 20.9	31.2	A	9.5	21.0	59.0		8.2	19.7	31.4	A
6.5	30.4	15.7	G	4.4	1 7.8	28.2	A	9.1	23.3	28.9	B	9.5	23.9	17.7		9.5	58.3	50.9	
9.2	50.8	8.7		9.5	2 13.9	15.5		9.2	24.4	43.4		9.3	31.9	9.0		9.5	41 4.9	54.0	
9.5	55.4	15.4		8.7	19.1	35.1	A	9.3	27.7	36.5		7.1	38.2	34.5	G	9.5	20.7	33.3	
9.5	55.7	39.1		9.5	20.2	49.9		9.2	57.3	9.2		9.3	43.9	7.3		9.5	28.0	43.7	
8.7	58.4	41.7		9.5	20.9	55.7		9.5	14 6.9	42.4		9.4	53.0	36.4		9.5	32.1	58.2	
8.1	51 14.3	3.1	A	9.5	34.4	7.3		9.4	38.3	11.7		9.3	56.0	35.4		9.2	59.3	58.9	
9.5	17.0	35.5		9.5	59.2	11.1		9.5	52.0	48.6		9.4	58.4	30.3		9.5	42 1.0	54.0	
9.5	20.0	22.3		9.5	3 7.2	15.2		8.0	52.3	8.2	A	9.5	28 16.1	50.5		9.5	2.3	24.5	
9.5	23.7	24.0		9.3	11.4	30.9		9.5	15 22.0	12.1		9.4	24.0	51.4		7.3	4.2	43.6	A
9.4	38.1	36.8	B	9.5	25.0	33.3		9.5	47.8	25.5		7.7	30.2	12.7	G	7.5	39.7	21.5	A
9.4	51.5	16.8		8.4	39.2	13.3		9.5	48.5	48.7		9.0	29 46.6	23.1		9.4	43 28.0	33.8	
7.9	58.1	5.7	A	9.1	58.1	51.2		9.5	16 2.0	17.2		9.5	30 21.7	8.1		9.3	29.6	2.0	
7.0	58.7	32.3	L	9.1	4 1.7	52.9		9.5	3.7	56.9		9.5	26.1	28.1		8.8	33.3	57.3	A
9.5	52 14.6	51.0		9.5	20.6	22.8		9.4	4.9	54.2	B	9.3	31.3	55.3	B	9.5	49.7	55.4	
7.0	21.2	31.7	L	7.7	31.3	25.3	A	7.8	21.7	24.7	B	9.2	34.2	5.3		9.5	55.2	29.9	
8.2	36.6	8.5	A	9.2	38.6	44.5		9.5	32.1	27.5		9.5	35.5	12.8		9.4	44 5.3	37.2	B
9.3	50.1	43.0		9.2	47.4	40.2		9.0	33.2	53.2		9.5	37.7	28.3		9.5	45 7.0	16.6	
8.5	53 2.8	44.7	B	9.5	53.8	43.0		7.3	17 3.8	22.0	A	9.5	50.9	22.3		9.4	9.2	27.5	
9.5	4.4	14.0		9.4	59.7	53.8		9.4	28.3	30.4		9.5	31 7.1	51.9		9.1	46 10.6	16.8	
8.8	7.7	7.4	A	9.5	5 4.8	47.4		8.7	40.1	57.1		8.9	8.5	55.7	A	9.1	15.9	13.3	B
9.5	21.7	33.0		9.5	6.7	52.0		9.3	52.0	20.4		9.5	22.0	58.7		9.5	44.1	57.9	
8.8	28.0	19.2		9.0	13.8	26.0	A	9.5	18 5.2	14.9		9.5	55.2	48.5		9.2	47 9.5	53.6	
7.5	29.4	54.3	G	9.4	17.8	58.5		9.5	10.1	30.1		9.1	58.8	39.8	A	8.4	28.7	34.4	
9.4	55.0	58.1		9.5	56.7	20.9		9.2	11.9	36.4		9.2	32 4.7	14.8		9.5	34.2	0.5	
9.3	59.4	41.7		8.0	6 12.8	46.8	L	9.5	20.0	20.3		9.5	19.6	22.9		9.2	38.0	49.6	
9.2	59.5	26.1		9.5	17.7	59.7		9.0	36.6	44.0		9.4	26.7	7.8		9.5	58.2	38.8	
7.4	54 28.8	54.4	A	9.5	28.1	18.6		8.8	41.7	12.9		9.5	31.0	6.1		9.5	59.4	11.0	
9.3	34.9	58.8		9.2	36.3	16.0		9.3	19 13.7	50.6		9.3	41.6	37.0	A	9.5	48 19.6	7.9	
6.3	43.0	35.4	A	9.5	48.1	58.6		7.3	25.9	59.7	A	9.5	43.7	25.2		8.9	49.0	52.0	A
9.1	55 15.2	19.9	B	9.5	7 3.0	36.0		9.0	58.9	52.9	A	8.5	49.5	4.6	A	8.6	49.6	43.7	A
7.0	35.5	50.7	A	8.1	5.6	21.7	A	9.2	20 34.3	27.7		9.4	52.4	32.5	A	6.8	55.7	23.0	G
8.6	54.1	50.0	A	9.5	32.3	26.4		9.5	57.0	3.8		8.8	33 4.0	1.6	A	8.8	49 31.6	19.8	B
9.2	56 5.7	53.7		9.4	50.9	0.5		9.5	21 11.9	44.4		9.2	40.1	51.2		9.5	39.7	24.5	
9.1	15.3	8.4		9.4	58.4	59.0		9.0	20.7	45.3		9.5	42.4	39.7		9.5	58.8	54.3	
9.3	15.3	35.9		9.4	8 12.1	1.4		9.1	20.7	13.0	A	9.5	34 8.2	23.3		9.5	50 15.2	2.4	
9.5	33.7	43.8		8.5	25.8	48.5	A	5.8	26.6	15.6	A	9.5	35 7.0	21.6		9.2	51 2.6	57.3	A
8.5	36.7	8.8	A	9.5	42.0	44.8		9.3	53.2	40.9		9.5	19.9	31.0		9.5	14.5	57.6	
9.5	49.8	39.3		8.8	53.9	37.3	A	9.5	22 1.0	47.2		9.4	26.3	25.0		9.3	37.0	3.4	
8.3	57 19.2	59.7	A	9.3	59.7	29.7		8.5	6.1	49.5		9.4	59.0	24.2		9.5	38.9	2.4	
9.4	44.5	45.3	B	9.3	9 1.0	2.5		9.5	15.5	10.4		9.4	36 2.9	41.8		8.9	52 3.2	10.1	
9.5	55.4	47.8		8.9	10.6	10.3	A	9.2	22.7	33.1		9.5	4.4	22.0		9.0	36.5	54.8	
9.5	58 4.7	21.2		9.5	20.5	28.5		9.1	27.9	48.6		8.7	8.0	5.0	L	9.5	59.2	43.6	
9.5	5.2	52.7		7.2	26.5	54.9	A	9.3	23 4.7	40.7		9.5	18.8	36.8		9.5	53 2.7	19.1	
8.0	39.8	57.2	A	8.5	36.5	21.0	A	9.2	26.1	58.5		9.5	23.3	33.7		7.3	14.6	8.7	A
9.3	40.7	26.3	B	6.7	38.6	39.2	A	9.5	27.5	22.8		9.5	33.7	49.9		9.2	15.4	13.5	
9.3	43.4	18.8		9.5	45.0	20.9		9.5	46.0	38.5		9.2	36.0	48.7		9.3	31.7	25.4	

501—560				561—620				621—680				681—740				741—800			
	1u—2u	+46°			2u	+46°			2u	+46°			2u—3u	+46°			3u	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	53 32.3	14.6		9.5	13 1.5	22.6		9.5	34 54.0	29.9		9.4	54 3.7	2.1		9.5	14 27.6	10.2	
9.3	54 49.1	0.2		9.1	23.5	0.3		7.2	55.2	13.6	B	9.1	8.6	30.7	A	8.0	43.9	49.6	
9.5	55 10.0	3.3		9.3	14 45.4	55.1		9.5	57.0	29.0		8.2	55 10.1	1.0		9.3	45.3	15.1	
9.5	24.0	51.0		9.4	46.9	49.7		9.5	35 1.3	35.0		9.4	42.1	50.3		8.0	47.4	47.3	B
9.5	39.2	27.0		7.5	15 5.7	42.3	L	9.5	27.6	11.1		9.5	55.0	53.6		9.5	49.4	54.3	
9.5	40.9	5.5		8.6	29.8	23.6	A	9.2	31.3	41.9	A	9.5	56 18.5	22.5		9.4	15 5.2	0.3	
9.5	52.9	5.5	B	9.4	16 25.3	6.5		9.2	49.8	22.8		9.1	36.9	19.5		8.8	22.3	49.7	
9.5	56 0.8	29.4		9.5	26.1	11.7		9.2	36 24.7	38.1	A	9.2	52.0	19.5		8.8	35.4	30.8	
9.5	4.3	5.4		9.3	17 0.8	22.1		9.5	42.8	11.0		9.5	56.7	49.8		9.4	48.0	55.7	
9.3	57.5	8.4		9.3	34.3	9.5		9.0	45.3	1.0		9.1	57.0	43.0		9.5	16 26.3	19.5	
7.0	57 2.2	10.2	A	9.5	45.5	37.5		9.4	52.4	51.2		9.5	57 31.6	18.2		8.4	26.5	45.1	B
7.8	6.7	14.7	A	8.9	18 5.1	1.5		9.4	37 8.2	37.7		6.4	53.7	44.5	A	9.1	17 9.0	18.1	
7.8	11.6	21.5	A	9.1	17.8	20.6	A	9.0	19.8	27.8	A	9.3	58 49.2	25.8		9.1	11.8	39.7	
8.4	31.0	17.1	A	9.0	25.2	29.3	A	9.4	20.9	40.9		9.4	57.6	3.5		9.1	17.8	2.1	
8.2	45.7	32.4	A	9.4	53.0	45.2		9.5	48.5	19.5		8.9	59 2.5	10.9		8.5	20.6	32.3	
9.3	51.0	14.2		9.5	19 18.3	20.2		9.5	38 14.3	52.4		9.5	31.9	40.0		9.0	18 11.7	32.3	
9.5	58 12.8	1.2		9.5	48.9	47.0		9.2	27.6	45.8	B	8.3	45.5	8.7		8.3	34.2	51.4	
9.4	32.0	37.4		9.3	20 30.6	10.2		8.7	51.4	20.2	A	9.5	0 1.8	5.2		8.5	49.0	52.1	
9.5	36.0	56.6		9.5	56.1	10.4		9.3	58.4	33.1		8.3	21.0	58.2	A	9.5	19 3.5	1.8	
9.1	59 8.4	21.9	A	9.4	21 34.3	54.3	A	9.5	39 16.5	11.8		9.5	1 7.8	50.3		6.5	21.7	26.6	A
8.8	35.1	51.0	A	8.6	46.4	23.7	A	6.8	27.1	38.1	A	9.2	22.3	40.0		7.9	37.7	59.6	A
9.5	51.4	5.0		9.5	22 32.8	32.1		7.8	51.7	31.6	A	9.5	2 16.4	40.0		7.0	20 20.0	32.5	A
9.5	58.1	9.4		9.5	59.3	20.4		9.5	40 19.1	39.1		9.4	31.5	12.2		9.4	21 33.0	39.2	
8.8	0 9.2	29.4		9.5	23 5.8	1.7		9.5	34.0	49.2	A	9.5	3 3.5	32.8	B	9.5	22 10.1	51.0	
9.4	21.5	51.6		9.5	20.6	43.5		9.5	38.0	59.5		9.5	22.3	57.8		9.5	22.1	27.9	
8.9	26.7	16.2		9.5	25.9	15.5		9.1	57.1	30.2		9.2	25.9	48.5		9.5	43.6	11.3	
8.3	1 15.0	47.2	B	9.5	35.7	55.3		9.2	41 45.7	30.1		9.3	42.9	36.1		8.5	23 11.0	55.0	A
8.0	43.9	39.3	A	9.3	24 15.5	10.8		6.0	42 0.5	14.5	A	8.2	44.8	15.5	A	9.3	36.8	21.4	A
9.5	44.9	4.8		9.4	34.3	20.1		9.4	15.5	18.5		9.5	55.7	45.5		8.8	24 2.3	20.7	A
9.5	51.0	51.5		8.0	25 0.6	3.5	L	9.5	43 1.4	11.2		9.4	4 0.4	45.5		9.1	3.1	47.1	A
9.5	2 15.8	48.4		9.0	2.8	15.5		9.0	44 7.6	35.8	A	8.5	12.6	15.1	A	9.5	59.8	2.1	
8.0	19.2	32.8	A	9.2	46.5	24.3		7.0	16.2	32.7	A	9.5	44.2	50.8		9.3	25 15.3	50.4	
9.4	39.7	36.4		9.5	52.3	0.4		9.3	45 5.1	42.4		8.5	53.6	34.8	A	7.1	48.4	36.8	L
9.5	3 9.3	21.5		9.5	27 6.8	12.5		9.5	19.3	11.0		9.2	5 11.8	13.0		7.7	58.5	5.1	A
9.5	4 6.7	30.4		9.5	7.1	55.6		9.0	43.8	48.0		9.5	19.0	2.2	B	9.5	26 0.8	33.8	
6.2	46.3	49.2	A	9.5	58.0	11.5		7.5	48.2	41.5	G	9.5	20.4	6.0		9.5	4.3	50.4	
9.0	56.2	0.5		9.5	28 0.4	9.6		9.4	46 3.5	0.8		8.8	23.3	44.0		8.5	32.5	46.1	
8.5	5 1.2	38.3	G	9.5	14.4	5.1		6.0	47.3	33.6	L	9.5	58.0	58.5		9.5	32.5	50.4	
7.0	32.5	0.6	A	9.2	24.5	6.7		9.2	53.2	45.5		9.4	6 6.3	52.5		8.6	53.2	44.5	
9.5	48.3	38.5		9.5	29 51.8	3.2		9.5	47 8.7	23.2		9.3	40.1	28.2		9.2	27 3.9	51.4	
9.3	6 33.5	36.5	A	9.5	30 8.6	56.8		9.5	11.9	35.2		9.5	7 15.5	3.5		9.4	26.7	42.1	
9.0	50.8	4.6	A	9.4	9.8	9.9		9.5	48 8.4	9.5		7.3	41.3	23.9	A	9.0	40.2	37.2	
9.3	7 10.8	56.0		9.2	31 6.5	35.5		7.8	10.1	3.4	L	8.7	8 8.8	1.1	A	9.5	28 44.3	22.4	
9.4	22.9	21.6		9.2	8.2	23.0	B	9.0	14.7	14.0		9.5	23.0	46.5		9.5	30 11.7	12.5	
9.5	8 0.4	15.0		7.7	35.2	56.2	L	9.5	49 39.4	52.3		9.4	29.2	40.6		9.5	31 14.0	2.8	
9.5	14.1	21.7		9.3	38.4	34.7		9.5	41.8	20.2		7.8	38.5	21.9	A	9.2	15.7	33.2	
9.5	32.1	13.6		9.3	44.5	5.0		9.2	45.8	14.0	A	8.3	40.7	29.8	A	9.5	32 37.2	19.9	
9.5	34.9	32.7		9.1	53.7	49.8		8.7	47.0	41.0	L	9.3	51.3	41.4	B	9.5	33 6.9	46.5	B
8.9	9 5.8	9.8		8.8	57.6	43.9	B	5.8	59.6	38.1	G	9.4	9 35.6	38.3		9.5	29.2	9.6	
9.0	9.3	0.3		8.9	32 8.4	44.2	B	9.1	50 54.1	14.3	A	8.8	39.2	2.1	A	9.5	34 31.4	52.3	
8.8	41.9	30.5	R	9.5	14.9	54.8		9.4	57.3	24.5		8.3	59.5	59.3		8.8	35 56.7	19.8	
5.2	56.8	41.8	G	9.5	49.3	0.7		8.6	51 14.4	40.0	A	8.0	10 4.3	45.6	L	9.5	36 0.5	48.8	
9.4	10 46.4	19.9		9.5	50.2	19.4		9.5	18.5	20.7		7.3	14.7	15.0	B	9.5	14.2	41.1	
9.5	57.4	45.9		7.6	54.8	24.8	A	9.1	19.9	15.2	A	9.2	38.5	9.8	A	9.1	33.8	2.5	
9.5	11 6.4	45.0		9.5	33 38.8	48.0		9.4	23.4	24.5	B	9.5	11 1.8	9.8		7.8	46.6	9.7	B
9.5	18.8	43.7		8.4	47.8	30.1	A	9.5	58.3	52.8		9.3	12 21.5	11.3		9.5	50.1	0.5	
6.5	20.7	38.0	G	7.9	55.9	20.3	A	9.3	52 11.7	38.6	A	9.5	46.3	8.3		9.4	59.0	55.8	B
9.5	31.3	7.5		9.4	34 19.9	50.5		7.0	53 1.8	31.2	A	9.4	58.8	58.9		9.5	37 27.0	19.5	
9.1	49.5	0.3		9.5	23.3	19.9		9.4	20.4	2.6		9.2	13 29.8	20.9	B	9.5	39.2	19.0	
9.5	12 3.3	33.0		9.3	24.8	41.0		8.8	47.3	46.5	A	9.5	38.5	2.3		8.2	38 31.1	13.9	B

801—860				861—920				921—980				981—1040				1041—1100			
	3ᵃ—4ᵃ	+46°			4ᵃ	+46°			4ᵃ—5ᵃ	+46°			5ᵃ	+46°			5ᵃ	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	38 37.8	13.5		9.5	7 17.5	6.9		8.1	38 43.5	56.3	L	8.7	3 53.8	12.9	A	8.8	32 25.1	20.6	A
8.0	46.6	20.9	A	8.8	8 17.0	32.3		8.7	39 8.3	15.7		9.5	56.4	34.4		9.1	33.2	0.9	A
9.4	39 0.5	58.9		9.4	17.6	3.5		9.5	21.3	22.8		9.5	4 30.0	11.0		9.1	33 29.6	12.3	
9.3	38.2	31.2		9.4	24.5	49.6		9.0	27.3	37.8		9.0	34.0	58.1	A	9.4	35.8	4.4	
9.4	40.8	33.2		9.5	35.0	2.5		8.4	40 24.5	0.9	A	7.7	45.9	13.5	A	8.9	38.9	47.7	A
9.0	43.1	17.5	A	9.5	9 10.0	53.2		9.5	24.8	15.7		9.3	55.0	58.8	A	9.1	52.9	2.1	B
9.5	50.9	56.6		9.3	14.3	32.7		9.3	31.5	29.6		9.5	5 26.8	19.5		9.5	35 22.4	7.4	
8.8	40 33.7	39.7		9.5	46.3	24.3		9.0	37 6	23.1	B	9.5	34.1	11.8		9.2	48.6	27.5	
8.0	41 20.8	39.6	A	9.5	51.7	30.8		9.1	53.8	41.5		7.1	43.0	14.9	A	8.9	56.8	20.7	A
9.5	45.2	44.5		9.5	10 22.9	1.3		9.2	41 0.4	45.5		9.4	47.6	12.9	B	9.2	58.6	55.5	A
9.5	42 36.6	34.7		9.4	39.4	41.6		9.5	51.8	19.0		9.5	6 40.2	50.1		8.0	36 58.7	55.0	A
9.4	42.2	37.7		5.1	11 6.9	9.1	G	9.5	55.3	42.5		9.5	7 17.3	21.0		6.5	37 24.6	39.4	A
9.5	43 4.7	53.3		9.0	12 33.5	43.0		9.5	43 5.8	22.0		8.0	36.4	52.6		9.5	54.8	31.0	
9.2	8.3	34.2	A	9.3	59.0	13.1		9.5	30.1	17.5		9.5	39.8	13.4		8.5	40 11.2	15.3	
8.0	13.1	28.2	A	9.1	13 3.2	7.8		9.3	32.9	6.8		9.4	8 45.8	28.0		9.0	13.3	47.6	B
8.5	29.6	0.9		9.5	59.5	46.3		9.2	44 28.3	29.1		9.4	9 6.2	50.0		9.3	26.6	12.8	
9.5	44 21.7	31.8		9.3	14 2.9	3.2	A	9.5	28.8	21.9		9.5	24.1	52.4		9.4	46.1	32.5	
9.5	45 11.3	2.5		9.5	27.2	2.6		9.5	45 2.8	29.3		7.0	50.3	48.8	G	9.2	55.2	44.7	A
9.5	52.9	48.1		9.5	48.3	28.3		8.9	54.5	14.6	A	8.4	11 3.8	33.4		9.5	41 16.9	2.6	
9.0	53.1	32.2	A	9.5	15 0.4	1.8		9.3	46 38.3	21.9		9.0	16.9	33.4		7.5	31.2	45.2	A
9.3	57.2	27.3	A	8.8	18.2	11.6		9.5	54.8	1.6		9.4	27.2	47.5		9.4	42 50.8	41.0	
9.0	46 4.1	9.1	A	8.0	21.4	43.0	A	9.5	47 56.9	5.8		9.4	47.1	11.9		9.4	43 20.6	41.8	B
9.4	21.4	0.9	A	9.3	59.1	53.1	A	9.5	48 10.8	45.0		9.5	52.8	7.5		9.1	44 4.1	49.1	
8.9	29.7	29.3	A	7.0	16 51.8	32.2	A	9.5	15.7	37.7		9.0	59.2	51.3		8.7	6.9	5.2	A
9.5	47 29.0	31.2		9.3	17 4.2	36.2		9.5	33.0	32.2		9.5	12 13.8	3.3		9.2	22.6	32.5	A
9.3	33.5	14.5		9.1	17.3	7.5		9.2	44.3	13.3		8.4	13.9	50.5	B	9.3	45 8.3	39.2	
9.5	33.7	19.4		8.4	25.6	36.2	B	9.5	45.1	41.1		7.0	25.0	52.7	L	9.5	37.8	7.6	
9.5	48 22.2	33.8		9.5	36.1	3.9		9.4	49 33.3	1.2		8.3	34.8	39.2		9.2	40.6	11.0	
9.5	54.6	45.5		7.8	19 25.3	7.2		9.5	50 0	19.5		9.5	13 23.5	4.4		9.0	52.1	56.1	
9.0	50 1.1	23.3	A	9.4	21 25.6	59.4		9.5	50 32.8	21.5		9.5	30.2	9.9		8.8	58.0	36.3	
9.5	4.7	3.7		9.0	39.7	58.4		9.3	51 27.1	32.6		9.4	38.6	4.3		9.0	46 3.8	38.5	
9.3	5.7	49.4		9.4	21 22.6	55.8		7.6	52 4.0	26.6	L	8.2	14 24.2	49.1	A	9.5	4.6	38.6	
9.5	5.8	11.0	B	9.1	31.9	40.1		9.5	11.3	32.2		9.4	34.8	45.1		7.8	47 5.0	39.8	A
9.1	55.3	30.7	A	9.5	57.0	51.9		9.3	30.6	7.8		9.4	15 18.8	2.6	B	7.9	48 28.6	53.9	A
9.5	56.5	45.5		8.8	22 38.4	22.5		9.5	35.4	12.0		8.0	26.2	41.2	A	7.0	43.1	30.0	A
8.2	52 19.7	34.2	A	9.5	24 47.5	10.1		9.4	53 28.8	40.7		9.4	17 8.5	20.7	A	9.1	49 [illegible]	36.4	
9.4	54 45.2	13.2		8.8	27 27.8	31.8	A	8.8	28.9	0.2	A	9.5	18 2.3	55.3		9.1	5.9	40.3	A
8.5	55 18.7	48.9	A	9.5	28 22.4	26.9		9.5	54 23.8	50.9		9.3	41.7	20.5		8.9	14.3	53.6	B
8.5	37.6	52.3	A	9.5	30.7	6.9		6.5	42.6	42.4	G	9.1	19 2.0	42.6		8.5	36.7	36.7	A
7.2	39.8	31.6	A	9.5	31 16.5	33.0		9.4	51.3	9.0		8.4	8.3	26.0		9.2	59.1	10.3	
9.5	56 2.8	22.4		9.3	20.9	40.3	A	8.7	56 31.6	54.4		9.2	20 33.7	59.8		9.2	50 18.1	7.9	
9.5	35.3	23.8		9.5	27.6	51.5		8.6	39.4	16.7	A	9.0	21 33.6	1.6		9.1	29.4	33.0	A
8.8	58 6.3	18.0		8.5	33 29.0	41.3	A	9.4	44.5	47.5		7.3	22 19.5	46.3	A	9.5	51 10.6	42.8	
9.1	44.5	18.5		9.4	57.5	31.6	B	9.4	57 3.9	45.4		9.3	20.2	24.1	B	8.3	38.6	37.4	A
9.4	59 9.1	53.6		9.5	34 7.5	40.3		9.0	58 2.0	28.6	A	8.7	23 20.7	5.1	A	9.5	52 0.1	14.2	
9.5	24.2	12.7		9.1	15.3	7.1	A	9.1	3.3	15.0	A	8.4	24 17.3	3.6	A	9.0	13.2	43.7	A
9.5	0 8.9	11.2		8.8	35 20.3	42.5		9.5	59 11.0	35.9		9.5	25 39.0	21.5		9.2	21.7	34.7	A
8.0	52.7	32.2	A	9.5	41.5	20.6		9.2	19.4	52.9		9.5	26 16.0	43.7		9.5	46.6	27.0	
9.0	1 30.2	33.2	A	9.5	50.1	9.5		9.4	40.5	7.4		9.4	29.1	5.8		9.5	53 5.9	15.8	
9.1	36.1	53.6	A	8.5	59.8	49.0		6.0	56.6	46.6	A	8.0	35.7	43.6	A	8.4	29.5	52.3	
8.8	36.9	1.6		9.5	36 11.0	51.8		9.5	0 42.8	55.5		8.7	27 19.1	6.5	A	7.0	48.0	33.4	
8.5	38.2	8.5		9.5	38.8	0.2		8.0	55.4	45.3	A	9.5	28 42.6	23.1		9.3	54 16.0	10.5	B
9.3	2 8.7	40.1	A	9.5	41.8	22.3		8.7	1 32.7	15.2		9.2	29 2.1	41.3		9.5	55 2.1	54.5	
9.5	12.6	32.7		9.5	59.3	27.3		9.1	38.5	34.6		9.1	48.1	15.8	A	9.3	20.7	3.0	
9.5	55.6	7.8		9.5	37 0.8	32.1		9.4	2 12.6	22.2	A	8.7	30 12.1	1.2	A	8.8	23.1	8.0	B
9.5	3 4.2	2.2		9.4	4.6	26.9	B	9.5	17.4	26.9		9.0	18.7	17.1	A	9.3	50.6	10.3	
7.9	6 18.7	23.2		9.3	47.0	52.1		8.3	22.4	40.2	A	9.4	28.4	9.5		9.5	56 7.6	36.2	
9.5	37.5	49.9		9.5	38 15.1	56.9		9.5	35.8	38.8		9.1	31 5.6	23.2	A	9.2	19.0	34.5	
7.9	50.7	19.5		9.5	26.6	55.1		7.6	3 2.5	48.0	A	9.2	18.1	7.4	A	8.2	57 9.3	40.5	B
8.8	7 3.6	53.5		9.4	40.3	7.1		9.3	11.4	55.5	A	9.5	31.6	42.3		8.9	30.2	27.5	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	5h—6h	+46°			6h	+46°			6h—7h	+46°			7h	+46°			7h—8h	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	58 11.8	9.6	A	9.3	23 34.0	4.1		9.5	53 21.8	23.0		9.4	23 17.8	27.3	B	9.5	49 10.9	34.7	
9.5	43.1	6.4		9.1	50.8	11.2	A	8.9	54 38.5	43.6	A	7.3	37.6	27.6	R	8.9	55.4	36.1	
9.5	55.7	33.2		9.5	58.7	2.1		8.3	50.0	52.9	A	9.5	24 49.1	57.7		8.5	50 20.6	2.2	A
9.4	58.1	39.5	B	9.5	24 12.9	34.6		8.6	55.3	13.1	B	9.5	25 22.9	6.5		9.2	38.7	52.4	
7.2	59 21.3	45.8	A	9.5	25 17.2	5.7		9.5	55 39.6	59.9	B	9.5	51.6	20.0		9.5	51 33.9	46.5	
9.5	0 1.4	30.4		9.1	55.4	52.8		9.5	56 7.5	48.6		6.0	59.3	29.7	B	9.5	52 1.9	56.4	
8.0	11.0	53.5	A	9.4	26 48.6	52.8	A	8.7	39.8	55.9		9.0	26 13.9	20.0		9.5	17.0	21.9	
9.5	20.8	27.5		9.5	28 55.9	2.8		9.5	57 26.0	37.8		8.9	29.1	10.8		7.3	48.8	0.3	A
9.4	43.6	34.0		8.8	29 29.9	43.0	A	9.3	58 6.0	37.8		9.3	51.1	11.1		7.6	50.0	37.0	B
9.5	2 0.9	38.6		9.0	30 7.5	28.9	A	9.4	36.4	24.5		9.1	27 28.7	11.5		9.1	50.5	51.6	B
9.0	2.4	26.9	B	9.0	18.0	43.3	A	9.5	59 1.0	40.2		9.5	32.3	20.6		9.5	53 20.6	37.6	
9.5	13.6	49.1		9.5	26.7	29.3		9.5	1.3	26.0		9.5	28 6.3	15.6		9.3	54 7.7	1.5	
9.5	18.6	18.3		9.0	28.5	8.3		8.4	49.7	1.2	A	8.6	32.7	20.9	B	9.3	52.8	45.1	
9.5	19.6	14.2		9.5	31 7.4	59.6		9.4	0 1.7	17.6	A	9.0	29 36.6	37.2		9.0	56 10.4	33.7	B
9.1	27.5	5.2		9.2	55.9	54.0		9.5	33.0	1.0		9.3	30 5.9	10.4		9.3	58.2	40.6	B
9.0	3 7.2	33.4		9.5	32 8.9	50.5		8.9	1 8.5	14.3	A	7.3	21.9	56.9	L	8.5	57 42.8	35.7	A
9.5	36.9	51.2		9.3	15.4	17.5		9.5	35.9	54.9		9.2	31 8.5	9.4	A	9.5	58 37.0	31.2	
9.5	4 1.8	18.7		9.4	50.1	16.2		9.5	2 35.8	1.2		9.3	13.8	50.0		9.5	40.0	22.2	
7.3	9.7	24.9	A	9.5	33 17.7	5.5		9.5	3 29.7	32.3		9.2	25.4	33.6	A	9.5	47.7	16.3	
9.1	15.0	45.2		8.3	34 19.8	7.2	A	9.5	42.4	40.2		8.0	32 2.9	50.0	A	7.6	59 3.5	11.1	B
7.5	6 29.7	4.1	A	9.4	44.8	50.5	A	9.0	50.0	21.0	A	7.8	26.2	9.1	A	9.5	25.4	52.4	
6.5	47.2	26.6	A	9.4	35 3.9	37.3		9.5	4 50.0	10.7		9.5	55.4	26.8		9.3	0 16.2	26.0	
7.7	7 0.0	1.0	A	9.4	22.0	58.4	A	8.5	59.9	19.1	A	9.4	33 13.4	29.3		9.0	44.9	50.5	
6.5	29.5	23.2	A	9.3	34.1	41.2		8.2	5 16.9	19.8	B	8.8	39.5	7.4	A	9.1	57.9	13.9	A
9.0	8 14.1	43.7		8.7	36 8.3	10.0	A	9.0	6 45.5	15.6	A	9.3	34 41.3	0.9	A	9.3	1 14.3	49.5	
9.5	31.2	42.8		8.9	18.0	14.0	A	8.0	48.1	34.4	B	9.3	51.4	37.6		8.5	14.4	24.8	
9.1	47.7	17.3		9.2	19.0	30.5		9.5	7 3.2	9.1		8.9	36 4.0	15.7		9.5	2 11.9	50.0	
9.1	9 2.0	11.8		9.4	20.4	18.9		9.4	48.4	14.1		9.1	13.5	9.8		8.4	20.1	26.2	B
8.2	18.6	42.3	A	9.1	31.3	13.6	A	9.3	53.6	16.1	B	8.5	13.5	27.3		8.6	42.0	34.6	
9.3	29.4	49.7	B	9.5	37 44.8	10.2		8.0	9 15.2	8.8	A	9.3	16.6	12.0		9.3	3 13.4	11.0	
9.0	31.1	43.7	A	9.4	38 40.0	49.9	A	9.5	57.0	14.1		9.2	54.7	1.6		9.3	48.9	10.5	
9.0	10 53.8	50.1	A	7.5	39 18.2	20.5	A	9.5	10 17.2	15.1		9.4	37 16.0	19.4		8.6	4 6.4	0.4	B
9.1	11 3.3	55.7	B	9.5	22.5	19.9		9.0	34.3	34.8		9.4	59.4	53.4		8.5	5 6.9	32.1	
9.0	3.8	40.0	A	9.0	29.8	17.8	A	8.0	11 11.5	29.9	A	8.9	38 18.1	59.0		9.3	11.1	58.2	
6.9	38.7	14.4	A	9.3	37.6	20.9	B	8.0	19.6	29.9	A	9.1	29.5	11.7		8.5	38.4	24.3	
9.5	48.4	21.9		9.5	40 52.0	14.6		9.5	37.0	23.5		8.5	49.4	44.0		8.8	51.3	49.5	A
9.5	12 23.4	59.6		7.5	41 2.7	41.2	A	9.0	52.6	35.8	A	8.5	39 23.4	27.6	B	9.5	6 29.9	44.5	
9.0	53.5	50.8	A	9.5	42 12.6	52.4		9.5	12 44.0	15.1		8.5	39.6	54.9		9.0	7 20.4	40.1	B
9.5	13 32.4	12.5		9.5	13.5	8.5		9.4	52.4	28.5		8.8	48.1	2.9		9.0	41.3	54.9	
9.4	14 23.6	18.9		9.5	31.0	8.8		9.5	13 11.0	40.2		7.1	57.6	9.0	B	9.5	8 0.9	30.2	
8.2	37.3	36.1	A	8.2	43 16.0	23.4	L	9.4	32.1	49.1	B	9.2	40 55.3	0.5		9.3	4.5	43.0	
8.3	15 30.4	52.7	A	6.8	44 35.0	0.8	A	8.0	46.2	1.1	B	9.5	41 7.4	37.6		9.5	47.3	39.2	
9.2	16 49.4	8.3	A	6.3	45 49.2	27.9	A	9.5	53.5	27.5		6.8	38.7	17.9	B	9.5	9 27.2	47.1	
9.5	17 43.3	15.0		8.0	51.2	43.1	A	8.9	14 25.0	22.0	A	9.2	43.0	54.4	A	9.1	48.5	55.1	B
9.4	47.5	10.0		6.5	46 11.8	52.5	A	9.5	15 49.6	28.0		9.4	42 8.5	54.4	A	9.5	10 12.4	11.7	B
8.3	55.8	25.8	A	9.2	47 14.6	47.1		8.2	16 12.5	29.9	L	9.5	23.4	38.6		9.5	17.2	39.1	
9.5	18 17.9	29.7		9.5	39.4	1.9		9.5	24.6	28.2		7.2	59.0	8.1	A	9.4	12 20.9	28.8	
9.5	19 12.4	59.1		9.5	45.5	41.2		8.7	17 17.0	58.7	A	9.5	43 49.8	33.2		9.5	24.5	39.6	
6.0	12.7	46.9	A	9.5	58.6	39.7		8.8	19.7	12.6	R	9.5	44 11.5	52.0		9.5	13 41.7	27.8	
9.4	51.3	3.4	A	9.5	48 7.5	37.3		6.5	33.0	48.5	A	9.5	45.8	13.9		9.1	45.4	14.8	A
9.5	53.8	16.2		9.4	49 15.6	43.6		6.7	39.0	15.3	R	9.0	45 34.7	14.9	A	9.4	14 4.1	26.8	B
8.9	20 0.0	18.8	A	9.4	44.0	39.3		7.5	43.0	33.9	L	9.5	46 22.5	38.6		8.5	24.9	51.0	A
9.5	0.0	19.5		9.4	54.9	49.1		6.5	18 19.0	37.8	A	9.5	29.4	49.5		9.5	29.3	31.8	
9.2	33.6	7.3	A	9.4	59.0	50.8	B	9.3	20 8.5	39.8	A	9.0	47 0.1	42.5		9.5	15 0.5	11.9	
9.5	36.8	49.3		9.5	50 28.4	30.4		9.5	49.6	0.2		8.3	35.4	49.5	A	9.2	44.4	29.8	A
8.9	22 6.9	41.5		9.5	51 1.7	29.9		9.3	51.2	38.7	A	9.1	40.5	12.4	A	9.5	16 14.4	59.9	
7.0	21.8	34.7	G	9.5	44.6	43.1		8.0	22 6.5	49.7	L	9.1	51.0	49.1	A	8.8	58.9	4.2	A
8.0	22.6	40.0	G	7.7	52 3.7	10.4	A	9.5	20.3	27.4		9.3	57.1	11.3	B	6.0	17 31.4	7.5	A
9.5	38.4	19.3		8.6	32.8	19.5	A	9.5	30.3	24.9		9.5	48 22.2	10.5		7.5	58.4	45.0	A
9.4	46.8	48.8		8.8	49.6	47.6	A	9.5	32.5	34.1		9.2	38.9	23.1	A	8.5	18 4.3	27.8	A

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	8ᵘ	+46°			8ᵘ—9ᵘ	+46°			9ᵘ	+46°			9ᵘ—10ᵘ	+46°			10ᵘ—11ᵘ	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	18 31.2	49.5		8.6	48 13.6	54.2		6.8	23 44.4	9.1	A	8.4	56 47.8	20.8	A	9.0	26 44.5	54.1	
9.5	40.7	2.9		9.5	59.7	40.3		8.3	58.3	52.2	A	8.5	57 49.4	36.2	A	7.2	50.9	24.3	A
9.5	19 3.8	25.3		7.2	49 34.0	18.9	A	9.5	24 2.0	34.5	B	8.3	58 5.7	47.7	A	8.4	27 4.0	0.7	A
9.1	21.4	0.4		9.5	51 20.6	32.8		8.6	20.5	59.2	A	9.2	15.1	4.5		9.5	28 16.5	53.1	
9.4	24.5	24.4		9.3	52 45.6	16.9		8.5	50.5	41.2	A	9.5	38.9	50.6		9.5	29 33.1	11.7	
8.6	20 6.9	26.3		8.8	53 54.0	5.2		9.1	54.0	10.6	B	9.5	40.6	12.5		9.1	33.7	42.2	
8.0	13.7	39.1	A	9.2	54 35.6	49.2	A	9.5	25 13.1	5.6		9.0	44.9	43.2		9.5	43.8	10.0	
9.3	14.5	53.8		9.5	55 12.6	39.3		7.8	28 26.0	33.8	A	9.5	59 43.4	14.8		9.1	30 30.2	14.1	B
8.5	16.4	20.8		9.5	56 3.0	41.8		8.8	56.5	34.8	A	9.3	0 3.6	33.6		9.3	32.6	15.6	
7.5	24.5	45.6	A	9.4	3.5	48.7		9.5	31 16.0	0.0		8.4	11.3	59.1	A	9.0	57.2	7.4	A
9.4	21 15.5	2.8		9.2	33.5	57.7		9.5	32.0	54.2		9.5	1 10.9	11.8		9.5	31 59.2	57.6	
9.5	21.8	13.2		8.6	36.0	44.3	A	8.9	32 13.0	52.7	A	8.9	57.7	23.3		9.5	32 15.5	49.6	
9.3	23 29.9	24.3		9.4	58 42.7	13.7		9.0	46.0	30.9	A	9.3	2 4.4	49.2		8.8	25.4	15.8	A
9.2	26 42.6	38.2	A	9.0	59 55.0	2.5	A	9.5	49.6	14.5		8.5	6.2	56.6	A	9.5	33 11.9	10.4	
9.0	56.4	37.2	A	9.5	0 21.5	3.5		8.5	33 26.7	10.8	A	9.4	19.3	36.2		9.1	31.2	36.3	B
9.0	27 5.3	8.0		9.5	1 38.7	39.3		9.4	56.0	52.3		9.0	33.9	59.6	A	9.0	34 30.6	44.7	B
9.4	54.0	53.4		9.2	2 1.1	5.5		9.5	34 12.8	52.4	B	9.5	54.8	52.5		5.2	35 0.4	57.6	A
8.6	59.9	23.3	A	8.3	18.0	5.8	A	9.5	29.3	11.0		9.4	3 43.9	52.6		8.0	28.3	57.6	A
9.0	28 8.8	19.4	A	9.5	59.4	31.8		9.2	29.6	29.4	A	9.5	49.5	44.2		7.0	36 47.6	19.3	A
9.3	30 13.4	49.0	A	8.5	3 16.5	15.9	A	9.5	53.5	13.4		8.3	4 58.4	18.3	A	9.1	57.4	27.2	
8.5	51.9	55.4	A	9.5	4 41.6	37.8		9.1	35 15.0	34.8	A	9.3	5 18.4	14.3		9.5	37 21.8	7.4	
5.7	31 0.4	20.6	A	8.9	57.3	2.5		9.5	31.3	34.8		9.5	46.0	30.7		9.4	26.5	29.8	
9.4	35.5	47.9	B	9.4	5 45.0	33.3		9.0	36 24.0	13.9		9.5	59.2	11.8		9.1	38 26.0	46.7	
9.5	32 26.0	49.0		8.4	51.0	3.5	A	9.2	34.0	24.4	A	8.8	6 12.9	32.7		9.5	51.9	12.8	
9.4	33 30.1	16.3		9.5	6 20.5	38.8		8.5	39.6	32.8	A	9.3	29.4	3.9		9.3	40 18.8	33.7	
8.8	34 6.0	50.7	B	9.5	30.7	16.4		9.5	55.4	47.3		8.8	57.5	41.2	A	9.5	57.2	14.5	B
9.5	48.8	33.4		9.0	51.5	46.7		9.0	37 12.0	31.8	A	9.5	7 8.9	41.2		9.3	41 20.7	33.2	
9.5	51.3	23.9		9.5	7 15.1	11.4	B	8.5	25.5	15.4	A	9.0	14.6	8.9		9.5	24.1	11.5	
9.5	51.3	47.2		9.5	48.8	15.4		9.0	38 6.4	32.9		7.2	30.9	9.8	A	9.5	43 6.6	35.2	
9.2	35 13.7	10.0		8.5	8 36.5	46.3	A	9.1	41.7	58.2		9.3	8 46.5	25.8		7.3	44 5.2	33.8	B
8.2	23.0	42.2	A	9.4	11 13.5	39.3		5.9	39 13.7	42.0	A	9.2	9 19.8	0.8		8.0	6.9	4.3	A
9.5	39.4	11.9		8.0	29.0	28.8	A	9.5	40 18.9	17.3		9.3	36.3	42.9		8.0	45 22.3	54.6	A
9.0	36 5.0	37.4	A	9.3	12 47.8	52.8		9.3	50.5	28.2		8.6	43.4	49.1		8.8	46 11.9	14.8	S
9.4	18.8	17.9		8.9	13 1.9	53.6	B	8.4	41 15.9	18.6		9.5	10 12.4	22.8		9.0	23.9	3.8	A
9.1	55.0	21.8		9.4	10.2	31.4	B	9.3	20.2	39.7		9.0	23.9	7.1		7.8	47 51.0	32.2	A
8.6	37 59.0	3.3	A	9.3	33.2	43.3		7.8	42.7	13.3	A	8.9	11 42.9	26.3	A	9.5	48 42.4	54.6	
9.5	38 15.5	29.5		8.5	14 46.2	16.4		8.5	44 10.1	22.3	A	8.5	12 1.8	42.2	A	9.5	49 5.1	37.7	
9.5	26.5	29.3		8.8	15 8.5	47.7	A	9.5	32.7	37.2		8.9	11.0	24.8	A	9.5	50 43.7	26.6	
9.4	33.0	9.7	B	9.5	36.0	57.2		9.5	56.6	26.8		7.7	21.9	58.1	A	8.4	51 18.5	33.9	B
9.3	43.0	29.4	B	8.8	36.2	43.7	A	9.5	46 22.5	54.6		8.7	37.1	53.1	A	6.0	55.9	17.2	G
9.1	39 5.2	54.8	A	9.5	58.5	43.3		9.5	52.9	44.7		9.3	38.3	46.2		9.4	56.0	40.7	
9.5	52.2	34.8		9.4	16 35.6	55.7		9.1	53.8	7.8	A	9.0	13 18.0	38.2	A	8.6	52 45.0	5.2	B
9.5	40 18.1	50.2		9.4	37.0	50.3		9.1	47 31.6	38.2		9.5	51.4	5.4		8.8	53 1.6	26.1	A
8.8	53.0	26.9	A	9.5	54.0	48.8		9.0	59.4	41.2		9.4	14 50.3	2.9		9.5	4.3	28.1	
9.4	41 13.8	17.4		9.5	17 30.4	4.8		8.4	48 3.3	36.9	A	9.1	15 23.4	7.7	A	8.6	49.8	23.6	A
7.8	28.7	27.4	A	8.0	18 18.0	22.8	A	6.6	47.4	5.8	A	9.5	16 19.9	1.4		9.5	54 2.0	13.9	
9.4	30.6	42.1	B	9.0	43.3	33.8		9.1	50.4	26.3	A	9.3	17 5.3	39.7		9.5	6.8	26.2	
8.9	42 10.3	39.3	A	9.5	19 2.5	35.3		9.5	51 11.9	54.1		8.8	32.4	54.1	A	8.8	10.8	58.0	A
9.4	46.8	2.5		5.5	10.0	13.9	A	9.5	40.4	36.7		8.5	42.5	46.2	A	9.1	55 8.4	23.1	
9.5	43 4.0	32.8		8.0	11.0	13.0	A	9.3	47.8	46.0	B	7.5	19 28.1	54.6	A	9.0	54.2	34.5	A
9.0	4.3	3.8		9.5	44.2	33.3		8.6	52 6.5	48.7	A	8.3	55.4	42.2	A	9.0	56 4.0	23.8	A
9.5	11.2	58.2		9.2	54.3	25.4		9.5	50.3	55.1		9.5	55.9	56.1		9.5	16.4	9.9	
9.3	42.1	7.8		9.1	20 13.6	43.3	A	9.5	53 32.3	2.2		7.7	21 11.9	35.7	A	9.4	57 43.6	44.0	B
9.5	44 21.5	50.3		8.8	19.0	47.3	A	7.0	55.3	53.6	A	9.2	26.5	16.3		9.5	53.9	47.5	
9.5	45 2.4	1.5		9.0	28.0	6.4		8.9	54 11.8	14.1	A	9.3	22 47.4	15.8		9.3	58 20.3	16.7	
8.8	43.0	13.4	A	9.5	58.8	27.9		9.5	36.0	16.8		9.1	24 48.7	28.8		9.3	42.5	24.8	
9.5	50.5	22.8		8.8	21 5.0	42.3	A	9.3	55 22.0	43.2	A	8.8	50.2	16.8		9.4	47.0	52.7	B
7.2	46 41.5	18.9	A	9.4	22 39.0	35.3		9.5	43.9	52.6		7.8	53.0	39.6	B	9.2	51.0	35.0	
6.5	47 0.2	12.4	A	9.3	59.0	23.9		9.4	47.3	43.7	A	8.5	25 15.1	56.1		9.2	51.0	28.3	B
9.5	48 2.4	24.4		9.3	23 35.5	19.9		8.0	47.4	2.8	A	9.1	29.6	9.9		9.5	2 27.6	26.2	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	11ᵃ		+46°		11ᵃ—12ᵃ		+46°		12ᵃ—13ᵃ		+46°		13ᵃ—14ᵃ		+46°		14ᵃ		+46°	
m	′	″	′		m	′	″	′		m	′	″	′		m	′	″	′		m	′	″	′	
8.0	4	56.5	59.6	A	8.9	49	1.3	38.7	A	9.0	42	22.3	49.0	A	8.6	27	59.4	53.5	A	9.1	6	57.3	45.4	A
9.3	5	5.4	30.5		8.9		8.9	12.2		9.5		49.7	57.5		8.1	28	0.2	44.0	A	8.9	8	5.6	12.6	B
9.5		22.8	4.0		9.0		52.0	32.7	A	9.5		51.6	12.2		9.0		24.9	27.1	A	9.4		9.3	56.2	B
9.3	6	33.4	9.5		9.0	50	16.8	5.6	A	8.0	43	54.8	51.9	A	9.5		42.5	48.5		6.8		19.0	59.7	A
9.3		35.2	34.1		8.7		21.8	19.7	A	9.5	44	23.7	25.1		8.3		44.9	10.7	A	7.1		21.2	6.3	B
9.1	7	9.9	3.0	A	9.4	52	55.4	36.5		9.0	46	8.3	21.2	A	9.1	29	14.2	37.5		9.4		21.5	10.6	
8.5		28.0	39.1	A	8.8	53	15.3	51.6		9.5		17.4	17.2		8.5	32	5.5	8.1	B	9.0	9	51.4	33.7	
8.3		37.5	39.1	A	9.1		59.5	38.7		8.8		18.3	37.1	A	9.5		52.4	2.8		6.5	10	26.7	14.3	B
8.8		38.0	14.9	A	9.4	56	16.0	38.1		9.2	48	21.8	15.2	A	9.4	33	22.2	55.7	A	4.0		52.3	45.7	G
9.4	8	58.0	59.1		9.1	59	22.0	1.7		9.3		29.7	22.7	B	9.2		25.7	56.5	A	8.8	11	28.8	8.6	A
9.2	9	5.5	15.2		9.5	0	5.4	46.3		9.0		55.8	13.2	A	8.4	35	48.5	57.0	A	9.4		47.3	6.6	A
9.5		15.0	31.7		8.8		58.6	20.1	B	7.8	50	6.3	23.7	A	9.5		48.5	8.2		9.1		52.1	31.7	
8.5	10	20.1	39.7	A	9.1	2	9.1	38.9		6.5		30.7	56.6	A	9.5	36	58.6	52.5		8.6	12	5.7	35.2	
9.0	11	5.2	20.3	A	9.5	3	7.6	0.0	B	9.5	53	33.3	24.1		8.9	37	22.1	3.8	A	9.5		15.3	9.8	
8.8		57.0	22.2	A	9.0	5	58.5	47.4	A	8.9	54	16.0	33.6	A	6.5		25.0	15.1	A	9.1		16.8	30.2	
9.5	12	15.6	7.3		9.3	7	12.7	7.4		8.2		21.2	43.6	A	9.5	38	46.9	4.5		8.5	13	0.8	45.2	A
7.7	13	50.6	7.4	A	9.1		24.6	25.5		8.6	55	21.3	12.2	A	9.4	39	16.4	48.5		9.5		34.6	43.7	
9.5	14	45.0	14.8		7.0	13	52.1	19.0	A	8.9		50.1	32.7	A	9.2		21.0	41.5	A	9.3	15	21.7	57.6	A
9.5	15	13.0	35.1		8.7	14	35.2	15.5	A	7.7	56	10.5	8.8	A	9.2		43.5	45.1	A	8.8	16	58.8	19.8	A
9.0		14.9	37.9	B	9.5		58.1	27.2		9.3		10.5	23.2		9.2	40	13.8	6.4		8.4	17	20.2	46.7	A
9.4	16	5.6	37.6		9.0	16	52.3	32.0	A	9.5	57	0.3	14.7		9.5	41	6.9	4.2		9.1	18	10.7	35.7	A
9.5	19	41.5	32.1		9.4	17	31.8	51.5		9.4		28.5	37.1		9.1		13.5	57.4		9.3	20	51.6	5.2	
9.5		46.6	13.6	B	9.5		32.4	37.1		9.1	58	11.8	32.5		9.2		43.4	56.8		9.5	21	13.3	6.9	
8.4	20	51.5	21.1		9.0		46.8	22.1	A	9.5		24.6	16.6		8.7	42	6.5	56.5		9.2	23	52.8	55.2	
8.8	21	4.5	30.1		9.5		56.7	51.4		8.8		30.4	55.5	A	9.0		55.3	33.2		8.9	24	30.7	51.2	A
8.8		24.0	50.0		9.0	18	50.2	24.2		9.5		54.2	25.1		8.5	44	59.2	13.8	A	7.7	25	50.7	14.3	L
9.3		32.3	53.9		9.4	20	26.9	24.7		6.0	59	22.0	2.6	A	9.1	45	48.7	32.8		8.5		59.4	28.4	A
9.5		46.7	9.2		9.4		57.3	54.4	A	9.4		57.0	14.7		9.3		49.8	17.9		9.3	26	49.2	14.4	A
9.5	22	1.5	55.6		9.5	21	5.4	2.8		9.5	0	19.3	11.7		9.5	46	16.4	8.4	A	8.5	27	41.3	29.7	
8.8		24.5	25.1		9.4		52.8	21.3	A	9.5		50.8	27.1		9.2	47	43.1	28.7		9.4	28	28.8	4.8	A
9.2	23	18.6	40.1		7.5	24	39.0	1.4	A	9.4	1	26.0	30.6		9.5	48	58.1	44.4		9.2		32.8	41.6	B
9.5		58.7	49.6		8.2	25	13.6	16.2	L	9.5	2	46.5	7.6		8.5	49	2.9	39.6	B	8.9	29	1.9	41.6	B
9.5	24	2.5	42.6		8.4	26	10.4	7.9	A	9.4		49.3	53.0	A	9.1		50.7	28.3	A	9.4		15.2	25.7	B
9.5	25	5.6	52.0		9.4	27	32.1	27.6		9.5	3	24.2	1.6		8.8	50	15.2	16.8	A	8.0	30	24.7	7.9	A
9.0		35.0	29.7	A	9.4		56.8	16.1		9.5	5	0.9	45.5		9.5	53	24.8	39.2		9.2	31	56.7	10.9	A
9.5	26	53.1	19.7		9.5	28	51.6	14.2		8.9	8	1.8	21.6	A	8.6		49.7	19.9		9.0	33	0.9	17.7	B
9.5	28	12.8	24.2		7.0		57.3	34.1	A	9.5		51.8	51.0		9.5	55	30.3	4.0		8.1		6.3	8.5	A
9.0		42.6	28.7		9.4	29	15.0	28.4	A	8.6	10	3.3	28.1		9.1		30.7	53.2		9.4		30.1	51.9	
7.8	29	23.9	57.0	A	9.1		25.0	55.1	A	8.5		7.4	58.4		9.5		49.8	48.2		9.2	35	12.3	39.0	
9.5	31	21.3	24.2		9.3		45.4	52.0	A	7.8	11	20.7	39.1	A	9.3	56	4.3	3.6	A	9.0		38.8	8.6	A
9.5		52.0	45.1		8.5		47.8	18.7	A	7.9		25.5	21.1	A	9.3		13.7	40.9	B	7.3		49.8	2.1	A
9.0	32	19.2	21.7		7.8	30	37.1	2.9	A	7.3	13	7.2	17.6	A	6.0		26.2	27.5	L	9.2	38	9.7	22.1	A
9.1	33	3.3	55.6		9.4		40.7	9.4	B	9.3		17.2	15.6	B	8.0		26.3	41.4	A	9.5		27.6	22.1	
7.8	37	50.3	25.2	A	9.3		47.3	59.9		9.3	14	47.8	16.3		8.0	58	43.2	59.6	A	9.5	39	54.7	39.5	
9.1	39	4.3	2.2		7.2	31	40.5	1.1	A	7.3	17	3.1	52.0	A	9.5		56.6	6.4		9.0	40	11.9	3.7	
8.0	40	10.8	28.7	A	9.3		47.5	56.0		8.5		14.9	24.2	A	9.0	59	9.7	14.3	A	8.4		23.5	32.5	
8.0		56.3	56.0	B	9.0		50.0	25.6		9.3	18	45.3	30.6		8.8		18.2	38.7	B	9.5		52.4	52.9	
9.4	41	30.0	39.6		9.5	32	19.8	58.5		6.0	20	3.1	46.6	A	9.1		33.3	45.7	A	9.5	41	38.2	35.5	
8.8	42	51.0	35.1		9.4		57.9	24.7		9.5		13.9	33.0		9.2	0	2.8	31.8	A	9.5		59.4	43.3	B
9.5	44	4.1	11.2		8.4	33	23.5	24.7	A	9.5		20.6	55.9		9.3		32.2	24.8		8.9	43	34.8	16.0	A
9.5		4.1	10.0		9.2		45.7	0.3	A	9.3		44.0	43.6		9.1	1	5.2	51.5	B	9.3		45.0	15.8	B
8.6		26.4	26.2		9.3	85	7.0	1.2		9.3	23	32.0	13.6		9.3		7.0	0.3		9.4	44	3.9	8.3	A
9.5		51.0	12.2		9.5		19.8	33.1		7.2	24	2.9	28.1	A	9.5		34.2	47.2		6.0		9.5	42.9	A
9.3	45	37.5	6.9		6.8		24.1	40.5	A	9.3		43.5	40.0		8.2	2	18.2	36.8	A	9.2	46	16.0	13.0	A
9.5		45.5	43.1		9.0		24.8	50.0	A	9.4	25	7.0	45.5	B	8.6	3	15.4	49.6	A	9.0		23.3	10.7	A
9.5	46	46.2	0.6		9.5		40.6	59.4		8.8		31.1	36.0	A	9.0	4	57.3	28.2		9.3	47	33.5	32.4	B
9.5		48.0	55.1		5.5	38	18.8	13.2	A	9.5		56.4	34.6		9.5	5	25.9	30.3		8.3		45.9	45.0	B
9.5	47	39.4	7.5		9.4	39	17.9	47.0	A	9.5		57.0	43.8		9.4		31.8	1.0	B	8.4		50.1	17.9	B
9.0	48	32.4	20.8	A	9.2		55.4	18.2	A	8.6	27	11.4	10.1	A	9.1		40.9	59.0	B	7.8	48	42.0	16.6	A
9.5		48.3	33.7		9.3	41	4.2	26.1	A	7.3		40.7	19.7	A	9.1	6	36.2	52.1	A	8.5	49	37.5	11.2	A

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	14ᵘ—15ᵘ	+46°			15ᵘ	+46°			15ᵘ—16ᵘ	+46°			16ᵘ	+46°			16ᵘ—17ᵘ	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	49 47.1	21.2	A	9.5	17 16.1	49.5		9.5	47 30.9	58.6		9.3	25 2.0	0.2		9.4	52 44.5	39.3	B
9.5	50 44.0	33.6		9.3	31.6	6.2	A	9.5	33.3	32.7		9.5	14.3	52.7		9.5	45.2	37.8	
9.4	51.7	41.0		9.5	18 9.7	11.1		8.3	48 6.5	28.8	A	9.4	23.3	55.6		8.5	53 17.8	56.8	B
9.3	51 24.1	56.9		8.8	20 27.8	38.0		6.8	34.3	28.2	A	9.0	37.7	30.2		9.0	24.4	58.5	
8.9	25.0	11.7		8.5	33.9	4.9	A	9.2	49 43.3	47.2	B	9.2	26 46.9	41.5	B	9.2	54 8.0	8.1	B
8.7	36.3	2.3		6.8	41.5	27.1	L	9.5	50 12.6	41.7		9.3	27 37.1	22.8		8.5	10.2	9.5	A
9.3	52 25.4	6.2		7.0	21 54.8	6.2	A	9.2	35.6	49.2		9.5	28 15.4	39.7		9.3	27.0	21.0	B
8.3	38.5	49.5	A	9.1	22 6.0	40.0	B	9.5	51 32.1	46.7		9.4	32.8	46.2		9.2	38.3	38.4	
8.8	39.9	22.1	A	9.4	31.6	31.5		9.1	36.5	27.2	A	7.8	29 18.1	50.2	A	9.2	40.9	29.0	B
9.5	53 7.2	31.5		9.5	24 32.3	8.1		8.5	46.3	21.8	A	9.5	59.1	49.7		9.4	41.5	20.5	
8.7	30.1	35.5	A	9.3	53.9	7.1	B	9.2	53 33.6	1.1	A	9.5	30 24.8	17.4		8.8	55 41.2	13.5	A
9.5	41.6	30.1		9.2	25 11.4	43.7		9.1	50.0	12.1	A	8.5	31 36.7	47.2	A	9.5	56 50.4	40.9	
9.5	54 1.4	21.6		9.2	20.0	48.3		9.2	59.0	12.7	A	9.4	50.3	39.2		7.8	51.9	28.5	A
8.5	27.2	2.1	A	7.4	25.0	53.4	L	9.2	54 25.7	0.8	A	6.0	59.3	55.1	A	9.5	57 24.7	50.8	
9.3	49.5	53.0		8.9	27 4.4	8.2	A	9.5	50.9	10.8		8.5	32 8.4	54.6	A	9.0	58 29.2	8.5	
8.5	56.0	16.2		9.4	53.2	57.8		8.8	56 42.1	40.7		9.3	10.5	6.9		9.3	46.5	53.8	
8.3	56 20.0	20.7		9.5	57.4	14.3	A	9.5	44.5	50.1		9.3	33.7	5.0	B	7.5	59 27.5	12.1	A
9.5	27.0	35.5		9.0	59.3	15.1	B	8.5	57 4.1	56.6		9.5	53.7	7.5		7.8	56.2	18.5	A
9.5	57 38.6	28.0	B	9.3	28 18.0	42.5	A	9.5	53.7	25.0		8.0	34 17.3	41.2	A	9.0	1 10.0	9.4	K
9.5	58 6.3	6.0		8.8	32.9	35.1	A	8.9	56.5	50.1		9.3	36.7	2.3		6.8	18.1	33.2	B
8.3	26.0	12.1		9.0	42.0	24.6	A	9.5	58 12.0	21.0		9.5	51.4	28.3		9.5	24.3	13.0	
8.5	31.5	43.0	A	9.5	45.3	50.5		4.1	17.0	26.5	B	9.5	35 15.5	26.3		9.5	33.3	10.5	
9.2	59 32.6	35.0		9.0	30 14.8	24.1		8.9	39.0	13.8	B	9.5	36 40.9	15.4		9.2	2 13.3	21.4	
9.0	0 50.5	16.2	A	9.1	17.3	41.5	A	9.0	59 21.1	52.2		9.5	38 12.7	24.3		9.2	59.2	26.0	
8.6	59.0	21.1	A	9.0	48.5	14.2		9.0	46.8	44.2		9.5	39 7.1	43.7		9.5	3 7.7	16.0	
9.5	1 3.5	40.5		9.3	31 38.4	46.9	B	9.0	1 3.4	22.8	A	9.0	27.8	17.9		9.3	4 7.7	5.1	
9.1	51.1	24.1	A	9.3	40.3	0.3	A	9.5	2 9.3	20.8		8.0	50.5	36.2		8.0	48.9	41.2	A
9.1	2 12.6	17.7	A	9.3	54.0	36.6	A	8.5	47.4	35.7		9.5	57.0	38.7		8.0	56.1	58.1	A
9.5	30.7	26.0		9.5	32 24.5	20.1		9.0	4 10.4	42.2		7.8	40 7.8	31.2	L	8.3	5 20.7	54.6	
8.9	34.5	18.7	A	9.5	33 27.5	49.5		9.5	12.2	53.1		9.0	41 35.7	32.8		9.2	33.2	25.8	A
9.0	36.2	28.6	A	8.5	34 20.7	20.6		9.5	37.6	16.4		7.0	36.5	18.8	A	9.1	6 20.3	4.3	
9.0	43.5	27.6	A	9.5	35 9.5	59.0		9.3	5 43.8	1.1	A	9.3	42 55.3	41.6	B	9.0	24.7	56.6	A
9.5	56.4	40.6	B	9.5	38.8	48.5		9.3	51.4	54.7		8.8	43 13.8	31.2	A	7.3	35.6	44.2	A
9.5	59.0	45.2		9.4	41.4	10.9		8.7	52.8	6.9	A	8.8	19.3	26.8	A	9.5	52.8	27.8	
9.5	3 27.0	40.5		9.3	46.9	5.2	A	7.5	7 52.8	34.3	L	9.3	36.5	50.2		8.4	7 8.6	10.3	K
9.1	4 31.0	16.2	A	9.5	36 27.5	19.8		7.3	8 17.3	16.3	A	9.3	50.3	44.7		8.9	37.2	52.1	
9.3	41.5	16.7	A	8.5	37 4.5	19.3	A	9.4	56.8	56.9		9.4	44 15.0	59.5		8.9	8 12.7	43.0	A
9.5	6 10.9	30.0		8.2	19.5	21.2	A	9.3	9 4.2	8.1		9.4	19.8	19.4		9.5	21.1	9.8	
8.8	23.2	0.6	A	9.5	35.2	2.9		9.1	38.8	44.7	A	8.8	55.9	27.8	A	9.5	25.8	39.6	B
9.0	34.8	53.5	A	6.8	57.9	12.7	A	9.0	10 0.3	56.6		5.0	45 0.3	13.9	A	9.5	30.9	2.5	
8.3	8 21.4	22.1		8.1	38 57.1	20.7	B	9.5	11 7.9	56.1		9.0	17.8	58.2		9.5	9 47.6	35.7	
9.5	52.5	13.2		8.2	40 20.3	8.2	A	9.5	15.3	17.9		9.5	47.1	49.1		9.4	48.2	8.3	
8.5	9 18.1	58.7	B	9.1	30.5	45.5		8.9	12 36.1	54.7	A	7.0	50.7	54.5	A	8.1	11 2.9	9.9	B
9.3	52.3	29.1		9.2	45.1	2.9	A	9.4	13 18.6	2.1	A	9.5	54.9	58.7		9.3	9.5	9.8	B
9.5	11 23.4	19.6		9.5	41 36.5	56.0		8.9	19.1	5.1	A	9.4	46 19.1	0.7		9.5	17.4	20.3	
9.5	41.0	36.6		7.6	42 16.5	44.8	B	9.5	14 40.1	8.1		8.8	45.3	18.9	A	8.2	12 20.8	52.8	B
9.4	49.1	43.5		9.2	23.9	49.8		9.3	15 10.4	42.5		9.5	48 9.3	58.7		8.8	13 3.7	45.2	
8.7	50.3	21.5		9.4	31.6	4.5		9.3	20.0	33.4	B	8.9	23.5	22.4		7.8	10.3	58.2	B
9.4	12 23.9	2.6	A	9.1	56.5	3.7	B	3.5	25.3	41.7	G	8.7	41.2	22.6	B	8.9	14 13.0	8.5	
9.3	32.5	31.0		6.5	43 7.5	10.8	K	9.4	32.8	16.6		9.3	48.3	12.9		8.1	50.1	38.2	A
9.4	53.0	43.0		9.4	15.2	7.2		9.4	51.8	5.4		8.9	59.4	49.7	A	8.8	15 58.2	52.6	A
6.0	13 20.3	9.0	B	9.3	25.6	42.1		8.9	16 1.2	43.9	B	9.1	49 13.8	48.1	A	9.5	16 11.3	47.2	
8.3	39.5	29.6	A	9.0	44 0.5	10.6		9.0	19 45.9	14.8		9.3	33.9	33.1		5.5	17.0	22.3	A
9.0	15 4.0	34.1		9.5	16.1	30.2		8.0	54.4	15.9	L	7.0	50 9.5	46.5	B	8.2	34.6	4.1	B
9.1	26.8	28.3		8.5	25.1	14.8		9.5	20 18.8	40.2		9.5	33.4	45.9		7.3	17 8.1	16.3	A
8.9	35.8	31.0		9.5	50.5	35.2		9.5	43.9	39.3		9.4	37.0	13.5		9.5	27.1	33.0	B
8.5	39.7	47.0		9.0	45 3.1	27.8		8.7	54.8	26.8	A	8.0	50.2	30.4	J	9.0	45.2	18.8	
9.3	51.5	52.0		9.5	25.6	34.2		9.1	22 3.3	29.2	A	9.5	51 55.3	56.8		9.0	18 16.7	26.3	
6.5	58.9	10.9	A	9.4	43.4	23.2		9.5	23 23.4	42.2		9.2	52 31.2	39.3	B	9.5	32.7	12.8	
7.7	16 40.5	52.7	B	9.5	47 29.1	37.7		9.5	24 31.4	17.3		8.8	42.5	5.7	A	8.7	55.8	49.7	

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	17ᵘ	+46°			17ᵘ—18ᵘ	+46°			18ᵘ	+46°			18ᵘ	+46°			18ᵘ	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	19 26.1	39.3		9.5	41 34.6	54.5		9.5	0 53.1	3.8		8.0	20 56.7	10.6	G	9.0	40 21.9	12.6	
9.1	31.6	7.1		9.3	37.6	16.0		9.4	1 22.0	53.7		9.1	21 5.8	6.7		9.0	28.3	58.8	
8.6	54.4	51.0		9.5	40.5	33.3		9.5	25.6	12.6		9.3	5.9	22.0		9.1	29.6	30.0	
9.3	55.9	55.3		9.5	46.9	49.7	B	9.5	45.7	55.7		7.3	17.9	48.9	A	8.8	41 1.4	7.9	
8.0	20 43.1	35.3	A	9.5	42 3.2	7.1		9.3	47.9	50.8		9.0	31.4	25.0		8.8	4.9	12.6	J
8.9	47.4	59.0		9.2	29.5	34.3		7.2	2 35.9	15.5	A	9.0	36.5	26.5		9.3	52.5	57.8	
9.5	21 19.6	25.0		9.5	43 42.2	51.6		9.2	51.7	9.8		9.5	22 2.6	50.2		7.1	42 5.3	28.6	L
9.5	28.0	2.1		9.4	44 0.7	28.4		7.8	55.6	45.9	A	9.4	11.9	35.4		9.3	15.9	28.9	
9.5	22 1.4	38.4		8.4	5.2	58.0		9.0	3 15.8	26.2	B	9.3	22.7	43.0	A	9.5	46.9	23.5	
7.8	9.7	58.7	A	9.0	45 7.5	16.3	B	9.4	48.8	28.2		8.0	24.6	43.4	A	9.5	49.2	52.3	
8.9	20.4	53.7	A	8.9	17.9	42.9	A	8.8	4 8.9	11.5		9.3	26.4	17.1		6.1	52.5	9.3	A
9.3	57.6	20.0		9.5	41.4	1.1		9.3	23.4	48.9	A	9.5	26.5	10.8		9.0	53.0	5.0	
8.0	23 0.8	23.5	R	8.7	49.3	22.0	A	9.5	42.6	34.5		9.4	23 9.4	9.2		9.0	54.3	2.1	A
8.7	44.3	32.5	B	9.5	46 41.5	14.3		9.5	5 21.5	29.0		6.5	24 31.9	20.5	A	9.0	43 17.9	44.4	
9.3	51.5	8.6		8.6	47 16.4	57.7	A	8.3	6 43.6	57.1	A	9.5	36.4	49.0		9.2	34.2	31.8	
9.5	55.4	24.0		9.5	26.6	16.5		9.5	54.9	21.6		9.2	25 21.5	12.1		9.4	44 39.5	21.2	
9.4	58.1	40.3		9.5	38.2	51.7		9.1	7 49.4	42.5	A	9.5	26.5	56.2		9.5	45 11.0	21.8	
8.0	24 10.6	11.0	A	9.2	40.4	57.7	B	9.3	51.3	17.1		9.5	26 16.4	38.5		9.5	26.4	52.1	
9.1	22.9	11.9		6.4	48 0.4	41.6	A	9.5	54.2	13.1		9.5	31.2	4.5		8.8	46 14.3	27.3	R
8.9	23.0	4.3	B	7.9	11.6	31.6	A	9.5	8 3.3	55.7		8.7	39.1	18.6	A	9.1	52.0	15.2	
9.4	25 5.5	13.8		8.4	11.7	58.2	A	8.0	6.9	42.4	A	9.5	27 37.7	0.7		9.4	54.0	38.6	
9.4	10.9	38.9		8.7	25.5	41.6	A	8.9	9 24.4	9.0	A	9.5	50.0	22.5		9.5	47 7.0	15.8	
9.4	13.1	25.6	B	8.5	26.7	7.5	A	8.7	28.4	23.1	A	9.1	52.6	57.8		8.3	7.8	34.6	R
9.4	17.2	21.6		9.5	52.0	23.8		9.5	28.5	52.9		9.1	28 46.7	4.7	B	9.5	12.0	53.6	
8.4	27.1	27.5	A	9.5	49 45.4	27.5		8.5	38.9	26.1	A	9.0	29 19.4	13.1		9.5	20.5	54.4	
9.2	51.6	27.4		9.4	50 40.1	11.8		9.1	51.8	39.0		9.5	34.9	41.5		9.5	21.3	37.2	
9.2	26 36.6	25.5		9.4	51 1.6	2.2		9.2	10 21.3	59.4	A	9.0	36.0	17.5		9.5	24.0	37.2	
9.2	39.2	56.4		9.5	8.9	21.1		9.4	45.5	57.7		6.5	42.2	6.3	A	9.5	48.7	13.8	
9.5	58.0	13.0		9.5	27.9	17.1		9.1	11 2.4	16.5	A	9.2	30 18.8	39.5		9.1	48 55.0	45.6	A
9.0	58.1	5.9	B	9.4	38.0	26.8	B	9.2	5.5	26.1		9.5	33.4	9.6		9.5	49 29.9	5.0	
7.0	28 10.6	26.0	R	8.2	57.3	58.7	A	9.3	16.7	5.7		9.4	54.0	40.4		9.5	39.6	1.5	
8.5	12.5	43.9		9.4	52 58.4	1.2		9.5	38.9	10.2		9.5	31 17.9	21.6		9.3	43.5	15.3	
9.4	41.6	39.3		9.2	53 33.9	24.6		9.3	12 58.4	44.5		9.5	34.5	3.2		9.3	50 1.3	47.6	
9.5	30 23.9	16.0		9.4	34.9	26.5		9.1	13 0.7	5.7		9.5	33 4.9	20.6		9.3	11.7	17.8	
9.3	31.7	25.0		9.5	39.6	44.6		9.1	17.4	40.0		8.3	18.7	58.1	A	9.5	48.8	1.5	
9.5	31 15.7	7.6		9.3	51.1	5.6		9.3	35.2	13.1		7.2	28.7	1.0	L	9.4	51 4.9	11.1	
8.5	19.1	15.4	A	9.3	54 25.8	11.9	B	8.3	48.6	43.0		9.4	34.2	25.0		9.3	41.6	31.3	
8.9	29.2	22.5	R	9.4	30.5	45.4	B	9.0	14 12.4	0.7		8.8	41.4	13.1		9.5	45.0	24.3	
7.8	46.6	43.4	A	9.5	55 17.9	55.9		6.5	15.1	21.5	A	8.3	58.9	41.4	A	7.9	46.5	19.5	
9.4	32 9.2	13.8		7.8	45.4	49.8	B	9.3	26.4	8.1	B	9.5	59.6	15.0		9.3	53.1	5.4	
9.5	26.9	38.9		8.3	46.9	32.5		8.8	52.6	48.6		9.2	34 32.6	52.8		8.3	59.8	12.1	
9.3	27.0	13.7		9.0	56 29.1	1.8		9.5	15 38.9	33.4		9.3	52.9	50.5		9.0	52 1.0	27.4	R
9.2	31.6	10.4		9.2	57 5.9	56.1		9.5	16 37.6	43.0		9.3	35 2.4	53.1		9.4	17.8	16.6	
8.8	58.2	53.0	A	8.2	23.9	4.5	A	8.1	52.9	56.1	A	9.4	21.7	32.0		9.1	23.0	57.4	
9.5	34 9.5	17.0	B	8.5	49.2	24.7	A	9.2	57.0	50.2		9.1	29.4	5.7	A	7.0	25.5	34.5	P
9.1	36.1	32.4		9.5	57.3	21.6		8.8	17 8.9	27.6	A	9.3	53.9	43.5		9.5	50.7	9.1	
8.3	35 9.1	14.0	A	8.4	58 17.4	31.5	A	9.2	46.7	41.5		9.5	56.5	20.0		9.5	53 2.3	22.1	
9.5	23.0	55.7		9.5	18.4	15.0		9.5	18 3.9	22.1		9.5	36 12.4	39.5		9.5	13.8	34.0	
4.0	23.7	4.8	A	9.2	24.7	27.1	B	9.0	18.5	55.6	A	9.2	32.9	13.3	B	9.3	29.0	9.0	
8.8	44.4	23.0	A	9.1	36.6	9.2		9.5	21.9	16.5		8.9	53.5	58.1		9.4	51.8	49.2	
9.5	36 54.0	34.3		9.5	48.7	28.8		9.0	25.9	57.1	A	9.4	54.4	32.0		9.5	55.4	35.4	
8.2	37 28.6	22.0	A	7.7	55.9	13.6	A	9.3	43.9	51.4		9.3	37 24.0	0.7		8.0	54 1.0	59.8	B
9.5	45.4	39.0	B	9.0	57.7	53.7		8.5	44.4	58.2	A	9.5	28.3	32.5		8.4	55 19.3	46.0	A
9.2	55.1	21.0		9.0	59 40.6	5.5	A	7.0	55.9	17.1	G	8.8	44.4	27.0		8.7	45.5	47.5	
9.5	38 5.5	40.0		9.4	48.4	30.5		8.9	58.3	24.4		9.4	50.0	53.3		8.5	58.4	38.6	L
9.4	25.3	44.0		7.3	0 2.9	25.6	A	9.0	19 2.4	58.4	A	8.7	38 2.9	52.8		9.4	56 1.3	4.2	
9.0	39 19.2	37.5	B	9.1	27.9	37.3	B	9.5	8.2	30.0		8.3	4.4	15.6	R	9.5	9.6	13.0	B
8.3	34.6	3.8		9.1	31.1	34.3		9.5	51.5	48.5		9.5	46.8	10.6		8.5	10.1	36.5	L
9.0	40 0.5	17.0	B	9.4	41.1	34.5		9.5	20 21.9	40.5		9.2	39 46.9	22.0		8.8	48.5	17.6	
8.9	23.1	39.9		9.4	43.9	50.1		9.2	23.7	31.0		8.3	50.8	4.4	L	9.3	59.7	56.9	

2601—2660			
	18ᵘ—19ᵘ	+46°	
m	′ ″	′	
9.1	57 0.8	20.1	
5.5	21.0	44.5	A
9.1	31.3	47.5	
9.2	58 11.7	2.3	
9.3	45.8	49.8	
9.5	59 9.8	24.6	
9.4	35.9	19.6	
9.5	0 21.8	22.1	
8.9	22.0	33.5	
9.1	23.5	29.5	
9.1	39.2	8.6	
9.4	53.3	5.1	
9.5	54.2	11.6	
9.1	1 1.3	40.0	
8.4	29.7	12.6	
9.0	51.0	12.6	
9.5	55.9	7.6	
8.9	2 4.4	33.0	
9.3	22.7	20.1	
8.8	31.5	15.6	
9.1	49.8	19.1	
9.4	59.3	3.4	
9.3	59.3	57.4	
9.4	3 17.9	51.7	B
9.3	27.4	14.3	B
9.5	35.3	9.5	
8.2	38.0	48.0	A
9.0	40.0	41.3	A
9.0	45.5	37.4	
9.5	4 4.7	26.6	
9.2	22.3	19.1	
9.0	26.5	2.7	A
9.4	30.7	10.4	B
9.5	33.9	49.1	
9.3	49.0	54.9	
9.3	5 15.0	48.0	
8.7	22.4	10.3	
8.6	48.7	46.5	A
9.0	6 22.8	55.7	A
8.8	7 32.3	25.1	R
8.7	51.1	4.4	
9.5	8 8.0	17.6	
9.5	26.5	9.2	
9.5	39.7	17.6	
9.4	9 6.5	7.1	
9.3	7.2	13.5	B
9.4	43.9	4.4	
9.5	52.0	59.3	
9.5	10 16.3	39.0	
9.1	54.7	38.5	
8.0	11 45.3	48.4	A
8.8	53.0	45.0	A
8.7	59.7	14.1	
9.3	12 6.2	49.5	
9.3	8.3	29.1	
8.3	12.8	10.2	R
7.8	14.0	19.8	L
6.1	42.4	44.2	A
8.3	44.0	55.4	A
8.1	50.3	9.2	A

2661—2720			
	19ᵘ	+46°	
m	′ ″	′	
9.5	13 8.7	54.5	
8.5	13.0	19.1	A
9.3	46.7	57.4	
9.4	50.5	25.5	
9.4	55.3	41.0	
9.3	15 23.6	13.6	B
9.5	25.8	28.0	
8.3	59.2	39.2	
9.4	16 6.7	47.5	
9.3	34.3	17.1	
9.5	17 32.9	51.6	
9.3	18 18.3	20.1	
9.3	20.7	40.0	
9.4	39.8	1.6	
7.2	47.2	0.7	A
7.0	19 6.2	54.7	A
9.1	12.4	55.4	
9.2	28.4	2.2	B
9.4	44.0	24.0	
9.3	44.3	43.0	
7.5	50.3	8.7	A
9.5	20 0.9	3.3	
9.4	21 7.9	52.5	
9.5	9.0	21.6	
8.8	9.5	13.6	A
8.2	12.5	40.0	L
9.1	19.7	2.7	A
9.3	22 36.9	10.0	
9.1	40.5	9.7	
8.9	49.6	10.0	R
9.4	23 1.3	41.0	
9.2	30.7	31.5	
7.8	59.6	44.0	L
8.5	24 33.0	41.0	
8.2	33.0	48.4	B
9.5	41.7	7.8	
8.7	59.1	3.7	
8.6	25 0.4	41.0	
8.9	9.2	48.5	
9.2	43.0	12.6	
7.0	44.8	39.0	A
9.4	26 2.0	27.1	
9.5	6.7	51.4	
9.4	12.3	43.0	
8.5	26.3	12.1	
9.1	31.2	13.0	
7.2	42.7	2.7	A
8.8	27 1.3	47.0	A
9.5	25.8	13.6	
9.4	38.7	22.6	
9.5	43.0	9.7	
8.8	51.9	56.7	
9.5	56.7	37.5	
9.4	28 0.2	18.1	
9.5	18.7	45.5	
8.2	25.9	0.1	A
9.2	33.8	16.2	B
9.5	38.5	41.0	
9.5	29 14.7	3.2	
9.5	26.5	9.1	

2721—2780			
	19ᵘ	+46°	
m	′ ″	′	
9.2	29 28.0	29.1	
9.3	34.0	44.0	
9.3	34.8	39.5	
9.0	46.7	17.6	
9.5	50.5	30.7	
9.1	30 26.3	32.5	B
7.3	26.7	8.7	A
9.5	40.0	9.7	
9.2	48.1	39.0	
9.0	49.0	21.1	
8.8	31 0.0	5.9	A
8.8	4.3	6.8	B
9.1	9.3	20.1	
9.3	9.9	51.8	
8.2	11.0	6.1	A
8.1	13.3	16.1	A
9.0	20.5	23.3	B
8.8	43.0	17.8	A
9.4	32 44.5	18.7	B
cum	52.0	3.5	
9.5	33 6.1	10.6	
9.5	31.4	56.0	
9.4	48.5	15.1	
9.0	53.0	24.6	A
9.5	34 25.3	0.4	
8.7	42.0	34.5	A
9.4	35 1.0	45.0	
9.5	12.1	58.5	B
9.0	36.0	14.1	
9.5	50.9	46.0	
9.5	53.8	8.8	
7.7	36 24.7	3.0	B
9.2	33.0	26.6	A
9.2	37.7	30.5	A
7.5	37 12.7	58.1	A
8.4	32.8	12.1	
9.4	48.3	29.5	
9.0	55.9	40.0	
8.8	38 21.7	28.5	A
7.0	31.3	52.4	A
8.8	41.5	44.0	
8.9	48.3	5.1	A
9.3	54.0	28.7	A
9.1	39 5.3	31.0	A
8.2	6.5	55.1	A
9.1	28.0	23.6	A
9.0	28.3	15.4	A
9.2	56.0	8 8	A
8.5	40 7.4	38.0	A
9.5	9.0	0.7	
8.7	12.0	11.6	A
9.5	30.6	36.0	
7.8	42.0	16.6	A
9.1	53.3	6.7	
9.5	41 11.0	50.0	
9.3	15.3	16.1	A
9.0	21.8	1.0	B
7.2	29.6	8.6	A
9.2	32.0	8.5	A
8.7	46.7	10.2	A

2781—2840			
	19ᵘ	+46°	
m	′ ″	′	
9.4	42 11.4	38.4	
9.2	19.5	35.0	B
9.1	43 18.7	21.6	
9.4	39.2	47.6	
8.5	44 55.6	27.5	
9.2	45 13.5	42.0	
9.5	16.8	45.7	
9.4	34.1	3.4	
9.2	34.3	19.1	
9.4	47.5	32.1	
9.0	46 21.0	39.1	
9.3	47 22.3	30.1	
5.8	37.2	39.6	A
9.3	51.0	16.1	
8.8	56.4	26.6	
9.5	48 6.1	55.0	
9.5	14.5	54.0	
9.5	29.0	48.5	
9.5	43.8	43.0	
9.5	49 1.2	3.1	
9.5	26.8	41.0	
8.6	35.1	26.6	
9.5	51.0	50.9	
8.6	50 32.3	47.2	
9.0	36.6	29.6	
9.2	37.4	13.6	
7.5	44.8	16.6	A
9.0	47.2	32.9	B
9.1	51 0.5	27.6	
9.5	4.0	10.6	
8.7	18.9	22.1	A
7.3	32.0	43.0	A
9.3	58.7	7.6	
9.3	52 20.5	37.5	A
9.2	42.6	53.7	A
9.5	53 12.2	49.5	
9.1	12.3	24.1	A
8.5	31.8	24.1	A
8.2	36.5	16.6	A
8.8	49.0	17.1	A
7.4	54 30.9	57.8	A
9.3	35.2	15.5	
9.5	59.0	28.6	
9.3	55 11.8	9.9	
9.0	45.5	13.5	A
9.1	56 0.0	16.3	A
9.0	6.2	58.3	A
9.0	26.2	46.0	A
9.4	44.0	32.6	B
9.5	57 7.2	5.5	
9.0	19.5	34.0	A
8.7	36.8	3.9	A
9.3	40.9	58.8	
8.9	50.4	4.3	A
9.5	58 6.9	18.6	
9.3	7.3	52.4	
9.5	16.1	41.9	
9.3	40.5	6.2	A
8.1	47.8	35.9	A
9.5	59 32.2	31.0	

2841—2900			
	19ᵘ—20ᵘ	+46°	
m	′ ″	′	
9.5	59 32.2	41.9	
8.8	40.3	19.6	
8.0	0 9.5	25.8	A
9.5	20.4	40.0	
8.6	50.7	47.8	
8.6	55.2	16.0	A
9.3	1 16.0	28.0	
9.5	35.1	52.4	
9.5	41.7	6.2	
9.4	54.2	30.5	
9.5	54.5	41.4	
9.5	2 33.6	5.1	
9.5	3 3.0	58.4	
8.5	5.7	43.0	
9.5	19.0	0.4	
9.1	39.0	21.5	
9.4	54.4	57.3	
9.5	4 9.7	28.1	
9.0	12.0	14.0	A
9.5	37.5	2.4	
8.5	40.5	14.1	A
9.5	5 1.3	6.3	
9.4	41.7	28.0	
9.5	43.5	39.0	
9.2	49.5	52.3	
9.5	6 1.2	11.6	
9.5	13.7	50.9	
8.4	34.7	41.5	L
9.4	38.9	58.9	B
8.0	53.7	29.5	L
8.8	7 3.4	41.5	
8.5	11.7	37.4	B
9.1	16.6	33.7	
8.9	18.8	10.0	
9.5	31.2	19.6	
9.0	43.2	35.0	
9.5	45.6	7.5	
9.1	53.3	9.8	
9.3	8 8.0	58.2	
9.5	28.5	48.0	
5.0	45.7	22.6	A
4.0	9 6.0	17.8	A
7.5	6.9	14.7	A
9.2	9.3	55.5	
9.3	27.2	20.6	
9.5	45.2	21.6	
9.0	10 31.0	30.9	A
9.5	44.6	10.6	
8.8	48.9	33.5	A
9.5	11 8.1	53.2	
9.0	9.5	23.9	B
9.5	15.8	27.5	
9.4	31.0	33.5	
9.4	41.4	23.6	A
9.5	48.9	6.7	
9.5	56.1	2.7	
9.0	12 7.4	30.0	A
9.2	25.6	51.9	A
8.8	48.0	57.9	A
9.2	13 9.0	8.4	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	20ᵘ	+46°			20ᵘ	+46°			20ᵘ	+46°			20ᵘ	+46°			20ᵘ—21ᵘ	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	13 9.1	18.6	A	9.1	26 37.4	23.9		9.1	38 7.1	44.8	A	7.4	47 1.7	11.3	A	7.6	55 48.1	0.6	A
9.5	16.7	19.1		9.2	51.2	40.0	A	9.3	28.5	3.3		9.4	22.6	14.3	A	9.2	57.7	55.2	
9.4	23.0	57.2	A	9.3	56.3	39.1	A	9.4	45.4	54.6		9.3	27.8	22.3	A	9.5	56 17.9	5.1	
9.0	41.5	19.4	A	8.8	27 27.8	18.4		9.5	49.5	36.4		9.5	29.9	28.9		8.7	29.1	37.9	A
9.4	14 6.8	49.6		9.1	52.2	5.2	R	9.5	50.4	8.2		9.5	34.7	15.1	A	7.6	39.8	55.8	A
8.0	7.5	5.2	A	9.3	28 9.7	6.1	R	9.3	53.3	19.7	B	9.2	35.0	38.5		8.6	47.1	0.0	A
9.0	52.6	49.9	A	9.3	22.8	21.8		9.5	53.4	57.5		9.3	48 8.1	8.0		9.2	51.0	14.0	
9.5	15 16.7	44.8		9.3	27.2	23.4		9.3	56.0	28.2		9.3	30.9	42.1		9.2	53.6	50.5	
9.3	17.0	9.1		7.7	32.8	40.0	A	9.5	58.3	18.4		9.4	35.0	27.7	A	7.5	57.0	26.9	A
6.5	20.7	22.6	G	9.5	33.7	4.2		9.5	39 16.9	4.2		9.5	42.9	39.2		8.6	57 9.9	6.8	A
9.3	21.4	42.1		9.4	46.6	14.4	A	9.5	42.0	48.0	B	9.5	53.1	32.2		9.2	26.0	30.5	
9.4	25.0	45.9		8.7	47.9	33.1	A	9.5	42.4	29.4		9.0	53.5	33.6	A	9.4	35.8	58.2	
9.5	34.0	39.9		9.0	53.7	48.3		6.5	49.6	46.2	A	9.5	49 7.3	52.4		9.5	44.3	21.1	
9.0	38.3	50.6	A	9.0	29 0.4	57.8		8.5	53.8	37.9	A	9.1	13.0	29.7	A	9.3	51.3	3.2	
9.2	40.8	41.9	B	8.7	0.5	29.6	A	9.5	40 9.3	35.2		9.5	15.8	50.1		9.0	58 4.0	36.0	
9.0	42.3	31.1	B	9.1	7.9	25.9	A	9.3	37.2	5.8		9.4	20.5	55.9		9.5	22.0	2.0	
9.5	50.2	22.0		6.0	10.3	11.6	A	9.0	40.2	59.5	A	9.1	24.5	9.7		9.0	31.7	24.7	
9.2	53.6	31.3		9.0	12.6	13.7	A	9.5	41 2.5	54.5		9.0	29.4	10.1	B	9.5	36.4	0.6	
9.4	16 3.8	58.4		9.0	24.7	53.1		9.0	16.1	22.9		9.5	33.6	50.0		6.5	43.1	17.5	B
9.5	8.2	9.9		8.9	29.8	41.8		9.5	20.8	45.9		9.1	36.5	54.7	A	9.0	48.7	31.8	
9.5	35.5	2.4		9.3	29.9	44.7		9.1	51.3	26.0		9.4	46.2	58.6	B	9.4	59.6	1.6	
9.5	51.5	37.0		8.6	59.5	20.3	A	9.3	53.8	7.7		8.4	49.6	43.3	A	9.5	59 0.7	53.0	
9.5	54.9	7.7		8.0	30 6.1	20.7	A	9.5	57.4	13.0		9.3	50 0.2	15.2		9.5	10.6	7.1	
9.2	17 21.7	43.7		9.5	15.9	12.6		7.8	42 2.7	34.9	R	9.4	9.3	46.1	B	9.5	12.8	13.5	
9.4	26.8	48.0		9.5	21.1	49.2		9.5	21.0	53.8		9.4	14.5	36.8	A	9.4	15.6	51.8	
9.0	27.0	38.0		9.2	40.8	56.5		9.5	21.2	49.2		9.5	24.1	37.9		9.4	36.4	30.5	
8.3	18 59.1	3.7	A	9.4	52.1	31.3		9.5	23.0	31.4		9.5	25.3	3.3		8.3	56.1	34.1	
9.5	19 24.6	50.6		9.2	31 24.5	15.2		9.5	25.4	57.9	B	8.7	25.3	55.7	A	9.1	57.5	55.4	
9.2	27.0	44.5		8.2	44.0	48.1	A	9.5	35.0	53.0		8.8	38.4	55.3	A	9.5	0 11.7	31.5	
9.5	39.5	35.0		9.3	49.6	32.3	A	9.5	39.5	58.7		9.2	38.5	27.7		9.2	15.0	54.9	
9.3	20 9.4	34.8		9.2	32 58.3	9.4		9.5	44.0	53.9		6.0	56.0	51.9	A	9.5	21.3	16.0	
9.0	29.8	57.9		9.4	33 10.2	40.0		9.5	43 0.8	11.6		7.8	58.4	32.5	L	9.5	26.9	42.4	
9.0	31.7	35.8	B	8.0	20.0	23.0	A	9.5	11.0	54.0		9.5	51 1.6	50.3	A	9.3	28.1	31.2	
9.0	21 30.0	29.3	A	9.5	24.8	18.2		9.5	18.2	20.7		9.0	2.9	27.7		8.1	33.4	23.1	A
8.5	41.8	47.3		9.5	38.2	3.0		9.4	22.3	53.2		9.5	5.0	37.7		9.4	36.2	31.9	
9.0	44.6	33.5	A	9.5	41.4	40.8		9.4	30.3	50.1		9.4	8.4	39.9		9.5	43.4	15.7	
9.1	57.8	56.4		9.3	52.1	16.1	A	9.3	34.4	6.7		9.0	25.4	12.5		9.2	44.1	25.1	A
9.5	22 36.3	46.0		9.5	34 17.8	18.5		9.1	37.5	13.7		8.7	41.3	38.4	B	9.5	48.8	59.6	
9.1	37.3	56.0	A	9.5	26.4	15.9		9.2	42.8	16.4		9.3	50.0	13.6		9.4	59.2	15.2	
8.9	48.6	58.0	A	9.1	45.7	50.3		9.5	45.7	9.6		9.3	52 1.1	2.6		9.5	1 2.1	35.4	R
9.5	50.3	24.7		7.5	35 0.6	50.1	A	9.3	44 21.5	6.4		8.0	33.4	37.6	R	9.5	3.0	37.8	
9.1	23 20.2	16.3	A	9.5	10.0	30.0		9.2	23.9	30.7		8.8	53 0.0	33.2		9.5	21.9	24.4	
9.5	26.1	12.0		9.3	12.8	22.5		9.4	27.4	4.9		9.5	10.5	40.8		9.3	24.7	11.8	
9.1	29.0	34.5	A	9.5	17.2	48.8		9.0	37.0	5.6	B	7.4	25.0	2.5	A	9.3	34.5	48.1	
9.3	52.3	56.7	A	9.5	25.1	40.1		9.5	56.8	59.7		8.5	32.2	15.5		9.5	44.8	33.1	
9.3	24 24.2	2.4		9.1	40.4	47.5		9.2	45 0.0	27.6		8.8	32.9	35.9	R	9.5	50.3	56.0	
8.5	30.0	37.4		9.3	41.1	25.1		6.6	1.2	7.2	G	9.4	38.7	52.5		9.5	2 10.0	21.3	
9.4	36.7	10.5		9.5	48.9	59.3		9.2	5.0	30.5		9.4	43.8	40.0		9.2	13.6	39.5	A
9.5	37.8	50.5		8.9	36 7.4	21.5	B	9.4	12.1	2.7		9.0	54 22.5	46.8	A	9.4	19.0	53.6	
9.5	45.3	33.0		9.3	16.0	57.4	A	9.4	27.9	55.0		9.0	39.6	57.5	A	9.4	20.0	19.8	B
9.5	25 20.8	40.2		9.4	16.9	24.8		9.4	28.5	24.7		8.3	44.6	15.4		7.7	21.2	41.5	A
9.5	36.2	4.8		9.5	20.6	35.8		9.0	46 11.1	8.1		9.5	46.3	4.9		8.7	34.7	43.4	A
9.5	40.5	8.7		9.5	37 15.6	21.4		9.0	12.3	57.5	A	5.3	53.8	57.4	A	8.8	42.9	55.9	A
8.8	53.7	6.6		8.5	24.3	39.9	A	9.4	14.5	38.0		9.3	53.8	58.2	A	9.5	50.1	24.3	
9.5	26 4.0	40.7		9.5	24.3	6.5		9.4	18.9	6.5		9.4	55 0.0	28.1		9.3	3 5.7	3.2	
8.6	6.6	17.5		8.0	43.1	52.5	A	9.0	24.6	4.8	B	9.4	6.9	5.4	B	9.3	10.9	56.8	
9.4	15.3	49.1		8.9	47.2	3.7	A	9.5	39.8	59.0		9.5	12.2	8.3		9.4	16.4	20.4	
8.1	17.8	16.7	L	9.0	49.3	36.6	B	9.5	50.6	47.9		9.5	31.5	56.5		7.7	27.1	40.2	A
9.5	20.9	43.5		9.2	49.8	30.1		9.1	52.5	1.1		9.5	43.9	4.4		9.4	48.3	10.6	
8.9	31.0	14.3		8.4	52.9	53.0	A	9.3	52.8	23.6		9.0	46.8	31.7		9.3	51.4	20.7	

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	21h	+46°			21h	+46°			21h	+46°			21h	+46°			21h	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.1	3 54.2	40.7	A	6.6	12 51.3	15.2	A	8.7	22 11.7	6.3	A	9.2	30 11.1	10.1		9.2	42 17.3	58.0	
9.5	4 5.8	49.0		9.5	13 5.1	30.9		8.3	12.2	11.3	A	9.4	31.8	17.0		9.4	20.0	40.7	
9.2	17.8	50.2		9.4	10.1	34.0		9.5	30.8	25.7		9.4	39.6	51.8		9.5	45.9	33.8	
8.8	24.7	13.2		9.2	12.2	40.1	A	9.5	58.4	35.2		9.5	52.1	18.5		8.2	49.1	8.8	A
9.4	31.9	50.5		9.1	15.2	6.4		9.0	23 4.6	2.8		8.2	58.0	8.0	A	9.2	50.0	13.0	
8.5	35.7	0.3		9.5	29.3	40.3		9.5	6.4	10.7		9.4	31 14.2	49.0		9.1	43 11.5	57.6	
9.5	53.2	16.4		8.3	45.0	23.8	A	9.4	6.9	18.0		9.5	14.5	36.5		9.4	13.2	0.3	
9.3	54.0	4.5		9.4	48.6	49.4		9.0	10.1	2.7		9.5	14.5	54.7		7.8	21.5	13.7	A
9.0	54.0	22.8		9.4	49.7	40.0	A	8.0	17.5	27.5	B	8.5	38.9	47.3		9.5	26.5	59.8	
9.5	5 4.7	43.0		9.4	14 1.2	53.7		8.7	31.7	28.9		9.3	44.7	9.8		9.3	34.0	14.1	B
9.5	7.0	32.6		9.5	4.5	0.7		9.3	36.7	6.7		9.5	55.1	4.9		9.5	35.4	33.8	
9.4	18.4	54.7		9.0	21.7	7.4		9.2	39.1	10.2		9.2	32 7.6	36.2		9.2	35.6	27.9	
9.3	27.9	37.0	R	9.0	37.1	35.9		9.4	41.4	16.9		9.2	10.0	41.8		9.5	41.9	21.5	
9.4	29.1	15.7		9.5	47.9	5.0		9.4	52.8	58.8		9.1	10.5	8.6		9.5	52.9	56.6	
9.5	45.7	31.2		8.9	48.2	43.3		8.7	55.4	38.4		9.3	20.4	8.4		9.4	58.5	35.7	
9.5	46.8	43.5		9.4	15 0.0	58.7		9.4	24 1.2	29.5		8.7	20.8	5.1	A	9.5	44 4.6	5.8	
9.4	51.3	1.4		8.1	15.3	56.9	A	9.4	7.8	15.6		9.0	29.5	44.4		9.5	19.0	43.8	
9.5	6 8.0	52.6		9.3	16.6	19.8		9.4	11.0	19.4		9.5	39.5	14.9		9.3	43.4	40.7	
9.5	22.3	7.5		9.5	22.1	28.0		9.1	12.3	31.9		8.6	33 10.8	10.3	A	9.5	53.6	59.3	
9.1	51.8	11.7	B	9.4	24.8	35.6		9.4	22.3	24.2		9.1	51.6	0.0		9.5	58.7	6.7	
9.1	52.9	37.7		7.4	34.9	19.4	A	9.0	24.0	54.0		9.1	55.9	55.3		9.5	45 11.4	23.5	
9.5	54.4	42.9		8.6	56.4	3.4	A	9.5	35.4	8.1		9.3	34 4.7	13.6	B	9.3	12.4	11.5	
9.2	59.5	13.8		6.5	16 6.2	7.2	A	9.4	41.6	44.1		7.2	13.3	32.6	A	8.4	30.2	29.7	A
9.4	7 9.0	9.2		8.0	16.0	24.9	A	9.3	43.0	24.5	B	9.5	37.8	10.1		9.4	49.6	55.2	
9.2	18.9	19.3		9.4	19.5	58.9		9.4	44.2	48.9	B	9.5	56.5	59.7	B	9.4	55.0	22.5	
9.2	21.5	27.6		9.5	39.5	55.5		8.4	25 0.5	32.2		9.1	35 23.8	13.9		9.5	46 0.3	18.5	
9.5	51.4	23.2		8.5	44.8	16.6	A	9.0	20.4	6.5		7.0	45.8	53.3	A	7.7	7.6	27.7	A
8.0	55.4	21.0	A	9.4	54.1	35.2		9.5	46.3	44.0		9.5	49.6	46.0		9.5	17.9	9.2	
8.2	59.8	11.1	A	9.4	57.2	9.9	B	9.2	46.7	18.9	B	9.5	36 50.9	6.8	B	9.4	30.4	3.9	
8.5	8 9.3	10.6	A	9.0	17 2.8	15.1	A	9.4	48.6	22.9		8.2	37 16.5	28.2	A	9.5	50.7	49.7	
8.5	12.4	18.8	A	8.0	30.9	59.9	A	8.5	57.9	57.0		9.5	34.3	36.6		9.5	47 0.2	32.7	
9.2	15.0	29.9		9.1	50.8	15.3		8.5	26 8.4	37.6		9.3	38.6	4.2	B	9.5	3.2	5.8	
8.4	26.4	22.2	A	9.3	18 30.3	45.1		9.3	25.8	11.2		8.6	58.0	23.4	A	9.2	4.3	25.8	
9.2	40.5	26.3	A	7.2	36.1	32.6	A	8.8	29.0	48.2		9.1	59.0	45.3	B	9.5	54.4	34.9	
9.5	9 20.6	38.0		9.4	41.0	56.9		9.0	48.1	23.4		9.3	38 2.5	35.2		9.3	55.3	30.9	
9.0	27.3	10.8		8.9	41.4	22.5		9.4	27 10.7	59.4		9.5	2.9	4.4		9.4	48 4.5	52.8	
9.4	29.1	40.7		9.2	53.3	48.0		8.8	35.4	47.6		9.2	8.1	41.8		9.4	5.5	58.0	
8.6	59.0	24.8	A	8.6	57.6	34.9	A	9.5	39.5	59.5		9.2	18.9	48.6		9.2	29.4	26.4	
9.5	10 1.1	51.8		9.3	19 3.1	52.5		8.6	42.0	52.5		9.1	29.0	48.3		9.4	36.2	34.2	
8.8	1.5	27.3	A	8.0	37.2	39.0	A	9.4	51.9	27.4		9.5	30.4	31.1		8.5	39.7	7.5	L
9.1	13.6	38.5		9.5	46.0	57.8		9.5	28 24.4	5.5		8.6	34.5	10.0	A	7.7	40.9	18.8	A
9.0	19.4	1.3		9.5	53.7	51.0		9.5	28.8	18.4		6.5	56.8	11.8	A	9.4	56.2	7.3	
9.1	23.6	34.7		9.5	54.3	52.5	B	9.5	33.2	12.4		9.4	39 6.1	26.5		9.5	57.6	14.3	
8.5	27.2	25.1	A	9.3	59.9	21.8		9.2	41.5	38.8		9.1	19.2	53.0		7.2	59.2	28.2	A
9.0	35.4	22.4	A	6.0	20 0.4	5.4	A	9.5	41.7	13.6		9.5	22.7	13.6		9.3	49 2.4	48.3	
9.1	42.4	42.9		9.3	14.9	23.9		9.5	43.2	16.9		9.3	37.0	45.6		9.5	6.4	48.8	
9.0	43.6	30.6	A	9.5	26.6	53.0		9.3	48.5	36.5		9.4	47.2	29.6		9.5	15.5	55.7	
9.1	45.1	52.2		9.0	27.8	12.0		9.1	29 5.6	46.8		9.3	51.3	32.6		9.2	17.5	55.0	
9.2	53.0	33.5		9.3	42.3	13.9		9.5	18.0	59.3		9.5	52.9	54.6		9.3	26.9	24.2	
9.0	53.4	31.5	B	8.8	45.2	8.0	A	9.2	30.2	20.4		9.4	40 29.7	40.0		9.4	29.4	20.1	
9.0	55.2	52.6		9.1	53.7	40.5		9.3	36.0	45.8		9.5	34.0	47.1		9.5	32.9	22.8	
9.5	11 26.3	50.3		8.5	21 4.4	53.3	A	9.4	36.6	0.1		9.4	44.7	3.0		7.5	36.6	45.8	G
9.3	40.7	11.8		8.6	11.1	5.1	A	9.3	37.3	44.0	B	9.4	41 4.6	43.3		9.4	51.0	55.3	
8.3	47.8	10.5	A	8.4	14.9	18.3	A	9.4	37.6	0.9	B	9.5	24.1	6.4		9.5	52.9	9.0	
9.2	49.1	28.0		9.5	34.2	0.0		7.8	38.6	26.7	B	9.3	32.2	41.4		9.4	50 19.2	57.0	B
8.8	50.2	44.8	A	9.5	44.9	45.3		9.4	50.5	10.4		9.2	38.5	1.0	B	9.4	22.6	52.6	
9.5	59.1	45.3		8.7	47.8	15.7	A	9.3	52.4	54.6		9.0	46.1	4.0	B	8.4	37.7	47.1	A
9.5	12 26.5	42.2		9.0	49.9	55.8		9.4	53.0	9.6		9.0	47.6	4.4	B	9.1	42.6	0.5	
9.0	40.8	15.8	A	9.3	22 2.2	22.1		9.2	53.9	6.8	B	9.3	52.9	5.2		8.6	48.8	49.0	A
9.5	44.4	22.1		9.0	7.8	7.3	B	9.0	58.3	25.8	B	9.4	42 13.5	30.5		9.5	52.0	59.3	

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	21ᵘ	+46°			21ᵘ—22ᵘ	+46°			22ᵘ	+46°			22ᵘ	+46°			22ᵘ	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	51 6.9	3.0		9.3	58 20.6	52.1		9.5	7 31.0	4.8		9.3	17 16.6	32.0	B	9.4	27 56.4	30.5	B
9.0	7.0	24.5	A	9.0	22.0	36.3	A	9.5	31.2	46.4		9.1	16.7	42.6		9.5	59.8	0.9	
9.4	12.6	41.9		9.2	31.0	42.1	A	9.3	33.1	19.6	A	9.4	20.5	54.6		9.4	28 0.0	19.2	
9.4	16.9	53.0		8.8	41.1	7.6		9.3	34.9	18.8	B	9.4	50.6	44.3		9.2	22.9	13.7	
9.1	22.4	40.2	A	9.4	45.5	11.5		8.7	54.5	27.4	A	8.7	18 1.2	16.5		9.1	23.3	58.0	
9.5	54.2	54.8		9.4	46.0	49.6		9.3	8 1.9	58.3		9.3	17.1	54.3		9.3	30.9	1.1	B
9.5	55.0	4.5		9.5	54.8	2.4		9.4	6.5	49.9	B	9.5	27.2	12.0		8.3	34.2	46.0	A
7.7	59.6	44.1	A	9.3	59 2.5	39.5	A	9.5	19.4	1.6		8.8	36.6	36.2		9.2	40.7	28.5	
9.5	52 5.7	50.2		9.5	4.4	5.1		9.4	31.9	30.2	A	9.3	52.2	53.6		9.4	29 5.8	6.0	
9.5	6.3	53.8		9.3	4.8	47.2	B	9.5	46.0	18.6		9.4	19 20.5	14.9		8.7	8.0	52.7	A
9.5	8.4	21.5		9.4	7.3	52.0		9.4	50.8	24.2		9.4	23.5	40.1		9.5	27.6	52.8	
7.2	12.8	10.4	A	6.5	11.6	31.9	A	9.5	52.7	49.0		8.3	25.4	22.2	L	9.3	30.4	14.3	B
9.5	23.4	0.1		9.4	20.4	15.0		9.5	9 39.5	12.2		9.5	29.7	42.6		8.6	36.6	2.3	A
9.5	38.9	28.4		6.5	30.9	2.7	A	9.5	55.0	28.0		9.3	33.6	58.5		8.9	40.7	28.2	A
9.5	42.3	7.9		9.5	31.5	40.0		9.5	57.9	34.5		9.5	35.0	16.1		8.5	50.6	50.7	A
9.4	50.7	4.4		9.0	47.7	17.8		9.3	10 11.5	6.6	B	9.5	47.2	8.9		9.5	30 15.6	10.7	
9.5	50.7	4.9		9.4	0 19.6	3.3		9.5	16.4	59.9		9.4	49.5	39.1		9.4	20.7	36.5	
9.3	57.8	57.3		9.1	27.5	37.3	A	9.4	19.1	4.6		9.5	50.7	14.1		9.5	36.1	18.3	
9.3	53 8.6	25.3		9.1	30.0	10.2		9.2	19.2	40.4		9.5	20 3.8	50.3		9.3	46.2	26.6	
9.5	13.1	10.0		9.3	35.6	34.3		9.4	19.6	18.5	B	9.5	11.5	32.5		9.2	31 5.3	19.4	
9.4	23.2	3.4		9.3	41.8	55.8		9.3	26.4	2.1		8.3	33.1	48.8	A	9.3	7.8	8.1	
9.5	27.0	29.7		9.5	53.4	5.0		9.5	34.3	12.3		8.7	40.4	57.5	A	9.5	21.5	34.6	
9.3	36.4	34.8		9.4	56.6	0.9		9.0	39.3	0.4	B	9.5	54.0	18.7		9.4	23.6	6.2	
8.9	37.3	58.4	A	8.5	1 4.3	32.3	A	9.5	47.1	20.9		9.4	54.9	24.7		9.4	28.5	43.4	
9.2	54 5.5	43.9		9.5	19.3	21.8		9.4	50.1	0.8		9.3	21 25.5	27.8		8.7	47.6	55.3	A
9.5	8.4	52.5		9.3	41.8	46.8		9.0	11 3.7	8.7		9.5	40.5	41.7		9.2	32 2.0	15.5	
9.1	18.7	16.3	A	9.4	44.0	53.8		9.5	9.2	33.6		9.0	44.8	22.5		9.5	10.0	14.8	
8.9	59.6	39.9	A	9.2	2 11.3	51.3		9.5	13.8	41.8		8.5	57.3	42.9	A	8.5	15.9	33.3	A
8.7	55 8.1	24.3	A	9.5	18.9	44.2		9.2	19.7	34.3	B	9.0	22 5.7	54.3	A	9.5	25.7	47.0	
9.4	10.3	59.2	B	9.3	25.7	29.8		9.1	25.7	49.9		9.0	5.7	45.1	A	9.4	31.2	27.6	
8.0	16.1	56.6	A	9.4	45.4	38.9		9.5	26.3	43.5		8.5	20.8	42.7	A	9.5	32.4	39.3	
9.3	17.5	34.5		9.5	55.4	45.5		9.5	26.5	6.3		9.4	22.9	45.1	B	9.5	33 1.9	38.9	
9.3	21.5	18.6	B	9.1	3 1.7	4.0		9.5	43.2	28.3		9.2	23.4	58.8		9.4	19.8	41.4	
9.4	30.4	16.0		9.3	6.3	32.0	A	8.3	12 26.7	38.2		9.5	30.9	1.9		8.7	22.4	44.5	B
9.2	47.3	4.0		9.2	10.1	20.2		9.5	27.0	52.3		8.8	47.0	15.8	A	9.5	23.0	51.5	
9.4	55.5	15.6		9.1	19.2	0.3		9.5	13 16.3	15.8		9.0	50.8	10.0	A	9.0	23.1	21.6	
9.4	59.0	16.6		9.5	26.5	47.3		8.9	20.4	8.9	A	8.7	54.8	26.1		8.2	28.3	18.3	A
8.9	56 2.6	5.3	A	8.8	27.1	51.3	A	9.5	28.5	57.2		9.5	59.2	1.0		8.5	36.6	59.9	A
9.5	9.0	16.6		9.5	34.9	5.4		9.4	34.4	21.1		4.8	23 30.1	57.9	A	9.5	55.6	39.5	
9.2	10.5	54.5		7.7	39.9	12.4	A	9.2	39.7	41.6		9.2	24 0.6	0.5		9.5	55.7	11.7	
9.5	13.6	12.6		8.4	4 4.0	59.1	A	8.0	52.6	10.1	A	9.1	3.2	5.7	A	9.5	57.0	33.8	
9.2	23.0	22.5	A	9.3	7.3	20.2		9.4	56.2	38.5		9.5	3.9	45.9	B	9.1	34 6.2	16.9	A
9.2	31.0	23.5	A	9.5	22.3	31.8		9.1	58.8	27.5		8.0	15.6	10.1	A	9.5	12.7	22.4	
9.5	34.2	40.6		9.3	42.7	34.8		9.5	14 1.5	14.8		9.0	32.5	6.1	A	9.5	22.3	7.8	
9.4	40.2	53.8	B	8.0	45.4	25.9	A	7.7	3.6	44.8	A	9.5	48.3	15.8		8.8	32.0	31.9	
9.4	48.0	31.5		9.4	51.0	20.5	A	9.2	46.3	26.2		9.5	53.2	16.0	B	9.5	32.3	43.2	
9.5	52.6	53.7	B	9.3	5 4.2	45.9		9.2	15 12.5	19.4	A	9.5	59.5	20.9		9.5	35 19.2	36.2	
9.4	57 1.5	45.8		9.4	16.7	3.8		9.5	27.0	46.9		8.7	25 3.7	22.8	B	8.8	19.6	58.1	
9.3	2.1	41.0	B	9.1	17.7	50.0	A	9.5	27.9	2.6		9.2	35.6	55.3		8.8	24.0	16.0	A
9.1	2.3	34.1	A	9.4	32.6	10.7		9.5	31.2	19.7	A	9.5	58.0	36.3		9.4	24.8	35.6	B
9.1	3.9	4.4		7.7	32.9	26.0	A	8.7	36.9	20.2	A	8.9	58.7	47.9	A	9.4	27.0	28.1	
8.9	10.4	34.1	A	7.2	6 11.8	22.9	B	9.4	50.5	47.1		9.5	26 20.2	48.6		9.4	40.9	45.7	B
8.0	11.7	50.6	A	9.3	26.6	30.1	A	9.5	51.0	37.2		9.5	33.9	29.2	B	9.4	43.3	5.9	
9.5	20.4	5.9	B	9.1	26.6	28.2	B	9.5	16 1.3	14.4		9.5	40.8	9.3		9.1	47.2	48.2	
8.6	29.6	3.8	A	9.4	41.0	22.7		9.2	13.0	1.7		9.3	43.8	9.0		8.1	56.5	18.4	A
9.1	48.9	23.6		9.5	41.2	1.3		9.4	41.7	54.1	B	8.8	27 18.2	6.8		8.2	36 2.3	58.3	A
9.1	58.7	5.7		9.4	41.2	59.1		9.0	48.8	42.3		9.5	30.3	44.6		9.4	4.3	25.1	
9.2	58 13.8	34.9	A	9.1	41.3	17.7	B	8.8	57.4	38.3		9.5	34.0	19.6		8.8	13.5	31.3	
9.4	16.6	45.4		9.2	7 19.7	47.3	A	9.4	17 11.4	46.1	B	9.5	34.9	35.8		9.3	14.5	17.3	
8.8	19.9	10.3		9.5	25.4	2.6		9.4	15.2	32.9		9.5	44.1	27.0		9.2	29.6	45.2	

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	22ᵘ	+46°			22ᵘ	+46°			22ᵘ—23ᵘ	+46°			23ᵘ	+46°			23ᵘ	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	36 42.9	22.6	B	9.5	46 33.0	26.8		9.4	56 58.3	36.0		8.5	7 57.5	45.6	A	8.5	18 17.1	24.2	
9.5	48.8	6.6		9.5	40.5	18.5		9.2	57 14.5	8.5		9.5	8 5.8	21.8		9.2	22.3	10.7	
6.5	49.8	24.0	A	9.2	42.6	1.4		9.2	42.2	0.5		9.3	13.3	46.1		9.2	28.9	7.7	
9.3	37 4.3	28.8		8.3	50.5	36.5	A	9.5	46.5	55.3		9.5	17.9	59.3		8.8	50.0	35.7	
6.8	28.8	39.0	A	9.4	47 2.5	38.0		9.2	58 22.3	7.0		9.1	21.3	36.5		9.5	19 8.7	46.6	
9.2	30.7	24.2		9.5	3.4	15.6		9.5	31.5	38.3		9.5	22.7	16.1		9.5	39.9	11.0	
9.4	57.0	21.1		9.5	12.5	18.3		8.8	48.0	4.9		9.5	47.9	2.6		8.0	43.9	30.1	A
9.5	57.0	33.3		9.5	27.2	20.3		8.0	50.5	44.5	A	9.5	9 6.3	15.4		8.7	20 15.0	48.2	A
9.5	38 6.8	31.9		9.3	29.0	56.5		9.5	51.6	52.8		9.0	28.8	53.0		9.5	33.3	35.5	
9.5	24.6	25.6		8.2	34.8	44.6	A	9.5	59 3.3	6.5		8.7	37.7	50.2	A	9.5	42.1	37.3	
9.5	33.5	4.8		9.4	49.8	9.6		8.0	57.3	8.3	A	9.4	58.6	16.4		9.0	54.4	2.0	B
9.5	40.7	49.8	B	8.8	57.0	36.8	A	8.9	58.4	45.2	B	8.7	59.3	44.4	A	9.1	56.9	53.7	
9.5	40.7	53.8		9.5	48 5.7	20.2	B	8.0	0 1.6	9.3	A	8.3	10 1.3	1.0	R	8.0	21 27.0	28.6	B
9.3	41.3	11.5		8.0	10.5	30.8	A	9.4	7.3	34.5		9.2	8.0	0.2		8.4	47.5	33.4	
7.7	59.2	26.9	A	8.6	16.1	47.9	A	9.5	24.7	45.8		9.0	22.0	28.3		8.8	22 51.5	52.2	
9.5	39 20.0	52.0		9.4	18.8	59.8		9.4	30.0	38.9		8.5	23.2	2.4		8.5	53.4	42.0	
8.1	22.3	23.5	A	9.4	40.0	30.1		9.5	30.5	53.6		8.6	48.8	31.9	A	9.0	56.3	6.6	
9.4	25.7	6.0		9.4	49 19.4	27.0		9.0	30.8	6.3	A	9.2	53.7	37.8		9.2	23 13.1	44.7	
9.5	57.2	19.3		9.5	28.4	17.7		9.5	1 1.4	16.2		9.4	11 14.5	46.0		9.0	21.0	27.5	
9.4	40 6.4	27.7		8.9	35.2	54.9	A	9.4	8.3	9.5		7.7	38.2	28.1	A	9.0	23.7	8.1	
9.5	9.5	58.4		9.5	39.5	24.6	B	9.2	15.5	9.5		9.5	52.2	36.2		9.5	32.8	45.9	
9.2	10.6	33.1		7.8	50 10.7	35.6	A	9.5	30.0	45.9		9.2	12 1.5	36.6	A	9.5	42.5	59.0	
9.5	12.3	1.3		9.5	22.5	29.3		9.2	32.7	36.0		8.2	7.0	34.8	A	8.4	46.1	13.8	A
9.1	27.2	22.4		8.5	40.0	24.8	A	9.5	37.2	4.5		9.3	16.2	38.5	A	8.6	47.5	5.8	
8.2	36.9	25.1	A	9.2	40.4	37.9		9.3	46.3	43.2		8.7	18.7	58.6		9.5	56.9	33.7	
8.0	41 16.4	52.6		9.4	46.2	40.9		9.5	53.1	36.8		9.3	20.5	56.5		9.5	24 5.8	45.8	
9.3	20.4	56.5		8.7	54.1	48.8		8.9	2 3.3	56.5		9.4	33.0	43.5		9.5	8.9	2.3	
9.4	31.2	45.5		7.6	59.0	2.5	A	8.7	4.0	38.6	B	8.7	52.1	36.5	A	8.9	27.1	37.0	
9.3	32.8	53.1		7.9	59.7	14.2	A	9.2	15.5	17.8		9.5	13 24.0	15.2		8.5	30.6	13.8	A
9.2	51.9	35.0		9.0	51 19.0	27.1		9.4	37.7	54.4		8.7	36.4	7.8	A	9.0	55.7	44.7	
9.4	53.1	48.6		9.5	37.2	57.6		9.5	42.5	38.4		9.5	43.8	15.0		9.5	25 16.6	58.7	
9.2	42 2.2	13.6		9.5	47.7	29.0		9.0	57.8	48.0		9.5	48.5	57.0		9.5	23.0	21.2	
9.5	13.5	51.3		9.5	52 8.5	26.6		9.5	3 21.3	20.9		9.1	55.3	15.6	A	9.5	38.5	5.0	
9.3	34.5	31.6		9.4	14.8	40.2		9.5	26.6	5.0		9.2	56.6	51.6		7.0	54.8	12.7	A
9.5	40.0	0.9		9.2	20.7	12.4		9.4	31.9	30.4		9.4	56.9	59.0		9.3	26 23.0	11.4	
9.2	50.8	35.4		9.0	34.2	34.2		8.5	33.8	47.5		9.2	14 14.0	7.8		9.4	51.1	27.1	
9.5	51.9	13.5	B	8.0	40.5	23.0	B	9.5	42.8	29.7		9.4	22.7	59.4		9.4	27 0.7	16.9	
9.5	54.0	1.1		9.4	40.6	25.5	B	9.5	57.2	12.8		8.5	45.4	58.1		9.5	10.7	38.0	
9.5	43 7.6	57.7		9.5	41.0	15.0		9.0	4 4.9	48.8		7.5	50.8	33.3	R	9.5	20.6	9.8	
9.5	24.9	41.6		9.5	49.2	45.6		9.0	23.3	1.0		9.4	15 9.4	59.9		9.5	39.4	28.4	
9.0	45.2	47.0		8.0	58.6	21.7		9.0	30.8	37.9		8.6	34.7	0.6	A	8.4	50.7	3.6	A
9.3	46.5	34.6		9.0	53 12.3	36.6		9.1	50.7	6.7		9.5	41.0	35.7		8.3	28 0.2	42.4	A
9.4	44 2.4	31.8		9.5	27.6	39.7		9.5	55.4	46.2		8.9	45.7	26.4		9.2	9.3	43.8	
9.0	7.2	32.4	B	8.7	54.2	40.9		7.0	5 2.5	19.4	L	9.5	53.9	52.8		9.5	12.7	17.4	
9.2	16.9	52.7		9.0	54.5	17.8		8.5	12.3	44.9		8.1	16 7.3	49.7	R	8.8	27.0	58.5	
9.3	20.1	49.1		9.0	54 21.7	0.3		9.1	14.2	6.3	B	9.5	28.1	41.0		9.4	39.5	6.8	
9.1	38.9	53.7	B	8.0	27.2	12.5	A	9.2	14.6	37.8		9.2	30.3	36.0		9.5	44.2	49.4	
9.5	43.9	57.5		8.1	34.7	32.4	B	9.5	48.3	36.6		8.6	40.3	5.6	A	8.9	47.3	41.0	
9.1	57.0	46.3		8.5	49.6	45.6		8.3	6 6.4	38.8	A	9.4	54.7	40.4		8.2	50.0	37.5	A
9.4	45 0.6	50.1		9.1	50.8	8.1		9.2	17.0	11.0		9.5	17 13.3	8.3		9.5	29 21.8	57.4	
9.4	28.5	36.2	B	7.7	57.2	3.0	A	9.5	22.8	14.3		9.5	16.0	2.0		9.5	30.2	49.4	
9.5	31.7	2.2		9.5	55 24.0	52.4		9.5	27.5	48.0		9.5	22.7	41.1		9.5	35.4	35.8	
9.4	32.7	59.9	B	8.0	27.3	13.6	A	9.5	34.0	28.0		9.3	32.0	29.3		8.9	39.0	11.9	
9.5	33.9	36.9		9.0	36.5	1.0		9.0	38.9	37.3		9.2	40.1	30.2		9.4	39.2	55.6	B
9.5	34.4	58.2		8.8	40.0	51.8		9.5	51.7	0.6		9.5	49.6	32.4		9.5	41.5	4.8	
8.4	46.6	48.4	A	9.4	44.5	30.8		9.5	53.7	31.2		9.3	50.5	7.0		9.0	45.8	32.4	
9.0	46 4.5	13.4	A	9.5	51.1	21.3		9.5	59.9	26.7		9.2	51.1	8.5	B	9.5	55.7	34.8	
7.8	10.4	59.5	A	9.1	56 26.8	45.0		8.7	7 0.6	24.5	A	9.2	54.0	47.1		9.4	58.9	59.7	
8.8	17.6	57.8	A	8.5	36.2	16.4		9.5	16.8	46.1		9.5	54.3	5.0		9.4	30 9.8	5.9	
9.5	19.0	2.5		9.0	49.7	49.6		9.5	55.3	30.0		9.5	55.8	2.1		8.8	17.6	18.3	

4101—4133				4134—4166				4167—4199				4200—4232				4233—4264			
	23h	+46°			23h	+46°			23h	+46°			23h	+46°			23h	+46°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	30 36.0	41.2		9.5	35 12.1	35.6		9.5	40 17.1	15.2		9.5	46 5.9	5.8		8.9	53 0.9	34.0	A
9.3	36.8	53.3		9.3	18.3	42.4		9.4	22.7	7.8	B	9.2	18.5	55.3		9.4	6.9	3.5	A
9.2	49.3	58.4	B	8.5	20.5	56.6	A	6.5	23.1	1.4	G	9.5	21.8	8.6		9.5	44.8	7.1	B
9.4	52.5	57.9		8.2	21.9	7.0	L	9.5	25.1	6.5		8.5	26.1	41.8	A	9.5	58.7	7.7	
9.2	57.0	24.0		9.3	35.0	57.2		9.4	42.3	50.5		9.5	39.5	44.6		9.0	59.3	35.4	A
9.2	31 2.2	35.1	B	8.4	39.2	38.8	A	9.5	47.3	50.9		9.0	54.9	42.1		9.5	54 43.0	22.7	
9.5	5.0	15.0		8.9	43.1	3.3		9.5	51.3	52.3	B	9.3	55.0	32.1		7.8	48.5	47.0	A
9.5	21.7	36.2		9.2	47.5	25.6		9.1	51.5	29.3		8.0	47 7.4	9.9	A	9.5	55 4.5	30.8	B
9.1	42.6	14.9		8.5	36 8.0	13.2	A	9.0	59.7	16.6	A	9.4	18.6	57.7		7.2	5.2	36.4	A
8.7	56.8	45.3		9.3	19.4	43.9		9.5	41 12.5	57.7		9.2	31.2	39.7		9.5	17.5	35.9	
8.9	32 7.3	38.8		7.9	29.8	31.8	A	9.5	27.7	34.4		9.1	37.1	5.5		9.2	23.8	3.3	
9.3	9.3	40.2	B	8.9	56.3	15.7	A	9.5	28.6	2.8		6.7	49.1	56.3	B	8.0	27.0	27.1	A
9.2	18.3	45.3		9.5	37 2.4	45.0		9.5	41.4	33.6		9.3	56.7	20.0		9.0	34.5	54.6	
8.8	29.3	38.8		9.0	9.0	40.2		8.8	42 10.3	12.3	A	8.5	48 2.9	21.0		9.4	57.2	58.3	
8.8	34.8	14.0		9.2	11.1	9.1		9.5	45.0	54.8		5.9	17.1	32.7	G	9.2	56 11.9	51.2	
9.0	39.0	18.8		9.5	17.2	27.0		8.5	50.6	46.9		9.1	31.6	43.1		9.5	40.8	45.8	
8.6	49.1	23.9		9.2	20.3	5.9	A	9.3	43 3.7	7.2		8.9	44.8	27.3		9.3	57 11.6	35.4	
8.8	49.4	45.1		9.2	21.0	8.1	A	8.4	17.4	14.5	A	8.4	49 14.4	55.7		9.5	27.5	20.4	
8.6	33 4.7	35.9		9.5	32.0	3.5		8.1	23.0	16.3	A	9.0	20.5	48.8		8.5	34.4	12.0	A
9.5	7.2	2.6		9.5	43.6	28.9		9.5	29.6	46.1		9.0	59.5	41.2		9.5	52.1	14.3	
8.8	7.4	5.1		8.3	58.4	7.1	A	8.5	37.7	42.1	B	9.0	50 2.5	28.5		9.5	58 0.0	19.3	
9.5	20.1	17.9		9.1	38 0.3	12.9		9.4	56.5	5.0		9.5	7.8	34.3		8.4	20.5	16.8	A
9.4	34.2	44.0		9.4	6.0	48.2	B	9.3	44 5.2	53.0		9.2	23.3	11.7		8.8	50.2	55.0	A
9.5	36.4	7.8		9.5	30.4	49.2		7.6	13.2	56.9	B	9.0	37.9	22.0		9.3	55.3	2.8	
9.5	53.3	27.7		9.5	45.3	14.8		7.2	18.6	40.9	B	9.4	51 13.5	26.1		9.5	56.8	14.1	
9.5	34 12.8	55.0		9.1	48.9	27.8		9.4	22.8	16.1		9.4	52 13.0	30.9		9.2	56.8	35.4	
7.0	15.2	3.4	L	9.5	52.0	23.6		9.5	41.2	20.0		9.5	14.6	48.8		9.2	59 8.2	50.2	
8.5	24.0	47.6	A	9.3	58.6	3.5		9.5	42.0	14.3		9.4	20.8	44.4		9.5	30.5	56.9	
9.5	44.5	16.1		9.4	39 11.3	41.0		9.5	45 1.5	1.6		9.0	21.1	20.9		9.5	41.4	35.3	
9.5	44.7	53.8		9.5	24.7	53.8		9.4	20.6	58.0		9.5	23.1	7.5		9.3	48.5	1.4	
9.2	59.5	23.4		9.0	29.1	42.2		9.3	44.6	14.5		9.4	29.4	47.6		9.1	53.1	17.9	
8.0	35 2.9	15.6	B	9.3	52.5	40.2		8.7	46.4	20.4		7.0	47.5	7.8	A	8.3	53.5	54.4	A
8.5	10.0	48.2		9.4	40 9.3	31.7		9.5	53.1	15.8		9.5	57.0	14.8					

Zone +47°

1—40				41—80				81—120				121—160				161—200			
	0h	+47°			0h	+47°			0h	+47°			0h	+47°			0h	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	0 32.2	39.0		9.5	8 22.0	21.9		9.5	16 2.9	3.6		9.5	23 12.5	33.3		9.5	32 2.3	58.2	
9.2	34.5	1.0		9.0	29.6	34.6		9.5	23.2	5.2		9.5	16.0	39.6		9.2	14.8	8.9	
9.5	45.1	52.0		8.8	32.7	5.2	A	9.2	28.6	43.1		9.4	23.4	20.2		9.5	23.5	36.4	
9.5	56.5	54.4		8.7	34.1	32.0	A	9.5	40.5	9.1	B	7.6	24 0.6	51.4	B	9.5	30.0	50.0	
9.5	1 7.8	18.1		9.4	46.5	13.1		9.0	17 0.5	52.2		9.5	25.8	38.0		9.5	33 20.0	12.0	
9.5	11.5	34.1		9.5	50.8	1.0		8.4	2.7	6.2	L	9.5	36.5	12.7		9.5	21.1	16.5	
9.5	30.4	33.9		9.5	58.3	8.8		9.4	6.9	45.9		9.5	51.8	16.0		9.5	23.6	19.4	
9.5	34.5	54.5		8.5	59.2	6.6	A	7.2	18.9	14.4	L	9.5	25 5.2	51.4	B	9.5	24.4	3.8	
9.0	40.7	15.4		8.2	9 28.6	45.5	R	8.6	37.3	39.2		9.5	14.5	14.8		9.5	35.7	51.7	
9.5	46.8	55.3		6.0	31.7	8.0	A	9.5	37.4	7.1		9.0	22.7	48.7		9.0	39.7	39.5	
9.2	54.9	19.5		9.5	34.5	33.3		8.4	42.5	53.1	R	9.3	33.5	6.0		9.3	50.6	52.8	
8.7	2 1.6	10.3		9.0	51.5	55.2	B	9.4	18 18.9	17.8	B	9.5	44.2	10.4		9.5	34 32.0	19.7	
9.5	7.6	36.6		9.5	10 8.1	13.8		9.5	23.2	57.7		8.9	26 2.3	51.3	A	9.5	46.7	8.5	
9.5	15.4	55.4		9.4	20.3	2.0		9.4	44.3	35.5		9.1	2.5	55.7	A	9.5	59.4	15.2	
9.3	25.1	27.6		9.4	21.0	10.4		8.9	52.4	38.0		9.5	11.3	28.0		9.3	35 22.6	10.8	
8.5	3 11.8	49.3	B	9.5	30.7	10.6		9.5	54.3	10.9		9.5	28.1	24.1		9.5	30.3	16.6	
8.2	22.2	18.5	L	9.5	40.0	9.3		9.5	19 14.9	41.0		7.8	30.0	17.0	L	9.5	33.5	12.8	
9.5	29.7	31.9		9.2	49.6	43.3		9.4	19.5	56.8		7.4	30.7	6.8	G	9.5	46.0	44.2	
9.5	4 0.4	25.4		9.2	50.4	21.7		9.1	28.7	32.5	B	9.5	40.0	50.0		9.1	36 1.7	23.9	
9.1	15.0	1.7		9.5	56.9	41.6		9.5	32.5	55.5		9.5	49.4	40.7		8.6	13.0	23.6	
5.5	25.2	20.8	G	9.2	11 4.0	36.1		9.1	42.1	32.9	A	8.2	27 33.5	37.3	B	5.8	24.1	4.2	A
7.6	28.3	52.3	B	9.5	11.0	30.3		9.3	51.8	28.9		9.2	42.9	13.7		9.0	37.4	8.1	
7.0	35.3	22.8	G	9.5	12.0	28.4		9.3	53.9	24.0		9.4	57.5	6.4		4.8	42.0	29.4	G
9.1	5 0.6	17.6		9.5	26.6	13.5		8.0	58.1	13.9	L	8.5	28 8.6	14.3	A	9.5	37 5.5	43.3	
9.5	21.8	33.5		9.2	54.8	20.7		8.5	59.8	56.7		6.8	19.7	45.4	L	9.5	36.2	55.5	
9.5	24.3	18.0		9.2	12 4.6	13.4		9.0	20 17.2	54.4		9.5	53.1	29.6		9.5	41.6	31.2	
9.2	26.3	54.3		9.5	5.4	42.1		9.4	53.1	42.1		9.4	59.8	7.6		9.0	46.2	26.6	
9.4	34.7	2.0		9.5	32.5	53.2		9.5	53.3	33.5		8.0	29 56.2	29.7	L	9.2	48.5	13.9	A
9.1	58.9	17.4		9.3	36.8	41.5		9.3	57.4	38.5		9.4	30 0.4	16.6		8.4	51.2	11.8	A
9.5	6 10.1	11.6		9.5	14 7.2	4.4	B	9.5	57.7	53.1		9.1	1.9	45.8		9.0	54.6	33.0	
9.4	15.8	40.4		9.3	20.3	18.2		9.0	59.1	6.9		9.3	2.8	7.6		9.5	38 1.2	8.6	
9.5	53.9	25.0		9.4	22.0	44.0		8.8	21 5.0	17.2	A	9.5	11.3	17.3		9.2	2.4	11.6	
9.1	57.6	43.7		9.4	47.5	41.2		6.8	8.4	36.4	A	8.8	20.7	13.6	B	9.2	3.6	4.2	B
9.4	7 31.0	59.1		9.5	57.1	13.4		8.9	46.5	56.1	A	9.3	26.2	59.8		9.5	16.1	27.8	
9.5	46.7	34.2		8.7	15 2.4	11.8		9.5	22 2.7	18.8		8.9	29.9	56.7		9.4	22.5	55.5	
9.5	55.8	39.4		9.2	14.8	5.7		9.5	3.0	2.5		9.0	49.1	21.4		9.2	31.5	28.6	
9.4	8 4.5	42.0		9.5	18.3	36.2		9.5	18.5	34.0		8.3	55.5	13.6		9.4	47.6	23.6	
9.0	9.1	31.0	A	8.3	25.2	24.3		9.5	20.6	21.6		9.4	59.0	8.4		9.5	59.3	43.6	
9.4	18.6	43.0		9.5	33.0	24.3		9.5	45.1	43.4		8.3	31 39.0	40.0		9.5	39 11.0	38.5	
8.3	20.7	47.1		8.9	59.4	16.3		9.5	23 11.7	29.8		9.5	47.1	17.9		8.9			

201—260				261—320				321—380				381—440				441—500			
	0u	+47°			0u—1u	+47°			1u	+47°			1u	+47°			1u	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.9	39 14.6	1.0	A	8.3	49 47.4	57.7	B	9.5	0 34.5	27.0		9.4	11 50.8	59.5		9.4	23 0.3	51.2	
9.0	21.9	30.8		9.0	48.0	38.9		8.8	58.6	13.7		8.8	56.7	14.1		9.0	34.4	40.5	
9.2	24.9	56.4		9.5	53.8	3.5		8.2	1 0.5	36.7	A	8.6	12 4.9	35.3		8.9	48.0	55.2	A
9.5	32.0	0.8		7.3	50 0.7	26.4	A	9.5	44.4	13.2		9.4	16.6	58.5		9.5	24 32.0	34.1	
8.9	57.8	53.6		9.5	13.1	55.9		9.5	53.2	46.9		9.5	46.5	9.0		9.5	52.7	1.7	
8.8	40 0.4	44.9		9.3	23.9	55.9		9.5	54.8	50.5		9.5	51.5	9.1		9.1	25 0.5	57.0	
9.2	4.2	35.8		9.5	33.0	36.5		9.0	2 2.4	16.9		7.1	56.9	19.1	B	9.2	10.8	34.7	
9.0	5.8	4.0	A	9.5	38.6	5.5		8.9	2.5	49.5	A	8.7	57.4	26.1		8.0	13.6	49.8	A
9.1	12.7	17.1		9.4	54.8	26.8		9.3	4.3	6.9		9.2	58.8	28.5		9.0	22.0	15.8	A
9.5	20.2	53.0		9.5	51 0.4	7.5		9.4	40.6	4.1		9.5	13 12.3	53.3		8.8	22.5	40.5	B
9.4	24.1	3.4		9.3	26.7	45.2		9.0	57.0	36.1		8.0	22.2	43.7	A	9.5	28.4	59.8	
9.5	31.3	7.4		6.6	43.2	14.2	A	9.5	3 9.5	40.3		9.5	26.3	22.1		9.0	34.0	11.7	A
9.0	46.0	38.6		9.2	43.6	22.6	B	8.0	25.2	1.6	A	9.4	57.0	9.5		9.5	35.3	2.5	
9.5	41 36.1	58.2		9.5	50.9	19.3		9.4	41.3	56.8		9.1	14 21.4	31.3		8.6	41.0	16.3	A
9.5	37.4	46.2		9.5	57.4	14.8		9.1	49.5	59.8		8.8	30.4	28.3	B	9.1	26 25.0	46.5	
9.5	43.7	59.3		9.4	52 5.9	25.7		9.3	53.8	18.0		9.5	39.0	47.9		9.3	50.4	13.4	
9.5	42 14.0	55.8		8.7	14.4	38.3		9.1	55.2	8.8		9.5	46.6	20.0		9.4	27 5.2	22.4	B
9.5	18.3	0.7		8.5	44.6	42.6	A	9.5	4 22.0	19.0		7.0	15 9.9	36.8	A	9.2	19.5	58.7	B
8.8	25.2	36.3		9.3	53 3.0	58.2		9.5	24.9	48.3		9.2	26.1	9.4		9.5	32.4	43.7	
9.5	29.2	9.6		9.5	13.9	32.8		8.5	31.0	40.4		7.5	34.0	32.2	A	6.4	37.4	58.1	A
9.0	40.9	53.7		8.0	18.3	34.1	A	9.2	55.6	3.7		9.1	43.5	53.1		9.5	39.2	57.5	
7.0	43 0.6	25.3	L	9.1	23.2	27.6	B	7.4	5 21.5	26.8	B	9.0	56.4	6.8		7.0	50.5	21.4	
9.0	17.8	11.8		9.4	48.0	56.2		9.3	29.1	26.9		9.2	16 16.2	57.9		7.0	58.2	34.6	L
9.0	23.0	27.8		8.0	54 10.2	42.6	A	9.4	41.9	40.7		8.4	18.8	33.3	A	8.5	58.9	20.0	
9.4	29.4	35.7		9.5	15.2	25.1		9.4	45.1	43.5		9.4	17 19.9	46.8		8.0	28 17.9	57.9	A
7.2	37.8	16.0	A	9.5	28.2	54.6		9.5	6 6.9	10.5		9.5	24.0	7.1		8.0	53.6	40.9	G
9.2	50.0	47.0		9.1	37.4	34.3		9.5	12.9	16.3		9.4	37.1	35.6		3.6	29 8.4	53.5	A
8.5	58.2	13.7	A	9.0	37.4	36.8		9.4	13.1	42.3		8.6	44.5	35.3	A	8.5	12.5	24.6	
9.0	59.7	1.3		8.2	42.4	56.0	B	9.5	18.4	51.4		9.0	53.8	23.8		9.0	18.4	37.5	
8.5	44 8.2	53.2		9.5	47.9	54.6		9.5	18.7	26.1		7.5	53.9	13.5	A	8.2	35.2	22.0	
9.2	44.4	42.4		7.7	51.2	4.7	A	9.0	20.9	29.0		8.6	18 5.0	37.8	A	9.3	43.0	44.3	
9.5	53.6	46.4		9.4	56.6	11.7		8.5	25.4	58.7	A	8.8	8.3	54.0		9.4	30 10.6	4.6	
9.5	58.1	47.1		9.5	55 6.5	7.8		9.5	33.3	45.8		9.0	59.0	36.8		9.5	14.8	21.9	
7.5	45 22.0	43.8	G	8.0	8.0	36.0	A	9.5	50.5	17.2		8.0	19 2.4	23.6	A	9.5	23.0	18.6	
8.5	24.4	1.6	A	9.5	13.8	36.7		9.3	7 22.6	45.1		9.4	7.0	47.6		8.4	37.3	30.9	B
9.0	35.1	12.8		9.0	19.6	9.6		9.2	44.3	9.8		8.5	9.1	51.8	A	9.0	56.2	59.6	
9.5	46 5.0	10.5		8.5	20.8	27.8	A	6.5	53.4	19.0	A	9.0	26.6	5.0	A	9.4	31 4.2	27.8	
9.0	19.5	4.1	A	8.6	25.0	0.5	A	9.2	56.0	56.7		9.0	32.5	9.2		9.5	6.8	33.9	
9.5	21.2	46.0		8.8	28.8	59.9	B	8.9	8 7.0	39.1		9.5	36.7	44.5		9.5	37.0	36.8	
9.5	38.9	12.1		9.5	52.9	31.0		9.5	23.0	52.8		8.0	46.0	34.0	A	9.5	49.6	20.9	
9.5	42.9	48.4		9.5	56 0.0	24.5		9.4	30.9	26.1		9.5	20 0.0	1.4		9.5	32 15.0	52.5	
6.5	52.6	53.8	A	9.5	50.0	55.5		9.0	31.9	46.8		9.5	4.5	59.5		9.1	33 9.1	18.1	
9.5	54.9	37.2		9.4	57 6.2	28.2		8.4	56.8	43.7		9.5	32.3	54.1		8.0	40.8	40.1	A
9.5	47 2.5	55.4		9.1	9.6	41.6		9.1	9 14.0	25.4		9.5	41.8	57.8		9.5	52.7	41.6	
8.8	4.0	0.6	A	9.5	20.7	58.5		8.9	21.0	57.6		8.5	21 10.5	26.7		7.3	34 16.0	47.1	A
9.5	11.2	44.0		9.5	46.8	20.8		9.4	26.2	26.6		9.1	26.6	7.7	B	8.9	48.0	32.3	A
9.5	13.1	32.7		9.5	58 2.5	34.0		9.0	39.5	13.8		9.5	29.8	13.1		8.5	56.5	49.0	A
9.2	19.0	34.9		9.5	18.0	57.3		8.5	54.8	2.0	L	9.5	37.0	47.2		9.5	35 1.0	40.1	
9.5	52.3	2.5		7.5	24.1	32.2	B	8.5	59.7	35.1		8.6	50.3	9.0		9.3	14.7	33.3	A
9.5	58.4	43.6		7.9	35.4	28.4	A	9.1	10 3.0	15.8		9.3	53.9	27.7		9.2	16.6	9.2	A
9.5	48 2.8	47.6		9.4	36.1	42.7		9.2	3.6	2.7		9.3	56.7	22.0	B	7.8	18.0	28.4	A
9.5	16.0	33.0		7.6	59 0.4	16.6	A	9.0	43.9	9.0		9.5	22 7.5	0.4		9.4	25.6	5.0	
9.5	29.1	3.7		9.3	14.2	5.2		9.5	52.2	49.5		9.3	8.1	20.8		9.5	30.3	20.9	
9.5	41.5	12.4		9.4	24.9	7.9		9.4	11 0.0	15.7		9.0	12.0	40.6		9.4	41.2	51.6	A
9.2	47.7	55.0		9.5	36.8	54.6		7.9	26.9	23.7	B	9.5	25.0	15.9		9.5	57.0	19.0	
8.4	49 6.1	7.0		8.0	58.6	49.5		9.4	27.5	27.1		9.5	28.0	9.3		9.3	36 59.5	5.8	
9.5	26.7	4.1		9.5	0 1.1	1.8		9.2	31.7	29.8	B	9.5	34.8	43.9		9.5	37 20.0	12.1	
8.2	27.6	23.6		8.3	7.9	24.0	A	9.0	34.0	50.7		9.5	47.9	34.5	B	9.4	38 10.8	49.0	
8.5	28.1	54.2		7.3	10.8	38.5	A	8.7	37.0	19.3		9.2	52.4	24.2		9.4	14.3	59.2	
7.5	34.3	19.2	A	9.2	34.5	22.0	B	8.6	37.2	6.6		9.3	53.1	4.6		9.5	28.6	29.3	A

501—560				561—620				621—680				681—740				741—800			
	1ª	+47°			1ª—2ª	+47°			2ª	+47°			2ª	+47°			2ª—3ª	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	38 41.0	12.1		9.5	56 38.8	41.1		8.7	14 42.8	47.6	A	8.0	32 57.5	44.3	A	9.5	46 23.6	18.2	
8.3	57.7	27.7	B	9.2	57 14.5	0.8		8.9	15 9.8	57.9	A	9.1	33 15.9	53.7	B	9.5	28.7	24.2	
8.7	39 22.0	39.2	L	9.0	25.7	2.2		9.3	17.3	31.1	B	6.7	18.5	38.8	A	8.8	59.4	56.9	
9.5	56.8	33.3		9.5	53.5	13.6		8.5	54.5	23.9	A	9.5	56.2	57.5		9.5	47 24.7	30.0	
9.0	59.5	42.1		8.5	58 1.8	22.4		8.7	16 2.4	19.5	A	9.0	56.4	3.0	A	9.3	43.2	34.5	
9.4	59.8	15.3	B	9.5	28.7	0.9		9.5	11.5	2.9		9.3	34 35.3	44.3		9.3	48 10.1	31.9	B
8.9	40 3.1	58.1		9.4	59 9.4	25.9		9.5	14.6	16.5		9.5	50.9	20.0		9.5	38.7	24.0	
6.2	18.1	11.0	S	9.5	9.6	36.8		9.2	17 27.5	33.3		9.5	35 14.0	37.0		8.0	45.3	6.0	L
9.5	27.2	11.0		9.0	22.4	27.4	B	9.5	40.7	16.7		9.5	24.1	41.5		9.5	49 56.5	23.0	
9.3	46.0	28.4		9.1	25.5	26.3		9.5	53.7	42.3		9.5	33.0	46.5		7.2	50 43.6	30.5	A
9.5	41 12.3	30.3		8.2	0 43.5	54.7	A	7.8	18 5.0	34.4	A	9.1	51.1	54.3		9.1	45.6	59.3	
8.4	16.1	48.5	A	9.5	53.5	2.2		9.5	5.6	54.4		8.3	56.0	32.0		7.5	46.2	18.9	A
9.5	52.6	19.1		8.3	1 15.0	35.8	A	8.3	9.7	31.4	A	9.5	36 58.0	24.6		9.5	52.0	47.5	B
9.5	53.0	39.2		9.5	24.2	26.2		9.3	40.1	50.7		9.5	37 0.0	51.1		8.9	52 7.8	51.8	A
8.5	42 38.8	7.5	A	9.0	29.7	38.7	A	7.5	19 1.7	38.4	A	8.9	28.0	28.0		9.5	21.2	31.6	
9.3	43 7.6	33.3		9.3	53.5	24.1		9.5	3.0	23.1		9.5	31.5	40.8		9.1	53 13.7	19.2	
9.5	38.4	9.0		9.5	2 24.6	35.8		9.5	10.6	12.2		9.5	38 8.6	7.0		9.5	40.3	39.9	
8.9	44 0.0	48.5	A	9.2	39.5	6.5		7.5	20 39.8	51.5	L	7.8	19.5	34.5	A	9.3	51.3	46.9	
9.5	28.1	57.9		9.5	55.1	43.1		9.5	52.0	34.0		8.0	38.7	25.6	A	9.1	56.2	8.1	A
9.2	45.8	51.9		8.2	3 4.0	33.8	A	7.4	53.8	12.2	B	7.7	42.5	51.4	A	7.0	54 1.7	17.0	A
9.2	47.0	34.3		8.8	25.8	11.9	A	7.3	21 4.1	9.7	B	8.5	51.0	36.3	A	9.0	19.2	20.7	
9.0	52.5	36.3		9.1	29.9	14.1	R	9.5	15.5	38.8		8.0	39 19.3	1.5		9.5	51.5	18.8	
9.1	45 32.0	3.8		7.6	32.8	53.3	B	9.5	29.3	43.8		8.8	33.8	38.4		8.4	55 4.2	20.2	L
9.2	39.1	11.6		9.2	4 6.3	45.6		9.5	22 1.6	21.0		9.0	47.0	47.8		9.3	25.7	21.6	
9.2	46 18.8	12.6		9.5	36.0	38.3		9.5	6.8	31.9		7.9	50.7	3.7	A	8.5	27.8	26.2	L
9.4	43.4	41.1	A	8.7	41.5	11.6	A	8.5	35.5	41.3	A	9.5	40 2.3	56.9		9.4	49.2	44.4	
8.2	57.0	47.1	A	9.5	52.5	33.3		9.5	23 37.1	15.8		9.3	4.0	31.5		8.8	56 19.4	10.3	A
9.5	47 15.6	22.4		9.5	5 12.1	46.6		8.2	41.2	6.4	A	9.5	15.0	25.0		9.5	23.2	58.9	
9.5	39.0	5.8		8.8	26.0	16.6		9.5	49.1	51.0		7.6	19.5	32.5	A	9.5	36.3	9.0	
9.2	48 12.8	28.6	B	6.7	6 37.3	8.0	L	9.5	24 1.0	37.8		9.5	35.8	54.6		9.5	57 12.3	24.6	
8.8	15.0	30.3	A	8.4	41.5	48.1		9.5	7.8	25.9		7.1	51.5	41.7	A	9.3	58.2	57.6	
9.5	36.1	50.4		8.8	7 0.1	33.3		9.5	20.2	56.8		9.3	41 18.6	30.0		9.5	58 26.7	2.5	
9.4	49 17.6	11.6		9.2	12.4	0.2	B	9.4	49.0	23.7		9.5	31.2	9.8		9.1	59 7.8	15.4	A
8.6	25.5	42.1	A	9.5	25.9	9.4		9.5	50.0	26.6		8.8	35.0	54.1		9.5	18.5	43.8	
8.8	28.0	44.1	A	9.4	26.0	45.5		9.5	56.0	36.0		9.5	58.5	57.1		9.5	1 1.7	58.5	
8.4	34.6	17.6	A	9.4	35.8	50.7		9.5	59.0	25.7		9.4	42 5.9	42.7	B	8.7	39.8	30.6	A
9.5	42.8	7.5		9.3	47.9	33.6		9.5	59.6	28.2		8.3	7.4	54.6	B	9.4	41.2	32.6	
8.8	50 7.0	37.3	A	9.0	52.4	54.4		9.5	25 37.0	38.8		9.2	11.5	56.6		9.5	55.5	51.2	
9.5	17.2	42.6		9.1	58.5	30.7	R	9.3	54.5	28.1		9.2	22.3	13.5	B	6.9	2 25.9	10.6	B
9.5	52.5	42.6		9.1	58.9	47.6		9.5	26 22.0	38.5		9.1	34.2	18.7	A	9.0	41.2	18.3	
8.8	59.0	44.6	A	9.3	8 4.9	50.4		9.5	34.9	2.4		8.0	49.5	49.1	A	8.5	3 18.7	33.1	A
9.5	51 43.6	57.4		9.2	22.0	28.4	R	9.1	35.5	18.6	A	9.4	54.5	41.8		6.5	20.6	39.5	A
9.4	52 1.4	55.0		9.1	47.5	49.0		9.0	27 11.0	21.5	A	6.7	43 30.9	58.2	A	9.0	37.6	16.6	B
8.4	6.0	15.1	A	7.2	49.0	29.3	L	8.9	52.2	11.2	A	9.4	43.7	58.9		7.8	48.0	22.1	A
9.4	36.2	32.3		9.5	9 24.2	59.3		9.3	52.8	56.5		9.4	47.1	12.6	B	9.0	4 0.0	44.0	B
9.5	36.2	39.2		9.5	10 25.0	56.7		8.5	28 15.6	14.8	A	9.4	50.8	9.4	B	8.2	2.7	15.8	A
8.8	40.0	48.1	A	9.5	25.0	58.6		9.5	24.0	57.5		9.4	51.1	7.9		9.5	39.3	54.4	
8.7	42.2	2.2	A	9.5	51.0	19.5		9.2	26.0	53.0	A	9.4	55.2	0.0		9.5	40.4	0.8	
8.5	53 42.1	12.1	A	9.2	54.5	14.1	R	9.5	36.5	57.8		8.5	44 19.3	38.1	L	7.9	56.6	44.3	A
8.5	45.6	13.6	A	9.5	11 5.6	18.6		9.4	42.4	44.2		8.5	27.5	21.6		9.5	5 26.9	21.1	
9.5	55.4	32.3		9.5	21.7	17.1		9.5	29 37.5	7.0		9.5	33.3	5.4		9.3	43.5	22.5	B
7.9	55.7	54.7	A	9.4	12 44.9	11.7		9.4	50.4	38.4		7.3	42.4	33.0	L	7.9	58.1	29.2	B
9.5	54 37.0	47.6		9.2	46.0	41.6		9.5	58.5	19.2		8.9	45 6.2	4.0		9.0	6 15.3	58.0	
9.3	55 22.0	8.0	B	9.3	55.9	56.0		9.5	30 27.1	38.8		8.3	15.5	39.0	L	7.8	31.2	44.4	B
9.4	32.2	36.8		8.9	13 15.4	42.6		8.0	45.4	48.9	A	9.5	31.7	11.2		8.8	46.2	35.6	
8.9	52.1	45.3	B	9.5	38.7	42.2		9.5	31 1.6	19.6		8.6	38.5	44.8	L	8.8	54.7	29.6	
9.2	56 7.4	58.4		9.4	59.3	31.0		9.1	5.2	56.6	A	7.0	47.0	44.8	L	9.5	7 3.8	3.6	
8.4	11.0	56.3	A	9.5	14 1.7	34.2		8.8	11.5	52.1	A	8.6	46 2.0	27.7	B	9.2	44.3	29.1	
9.5	23.3	6.8		9.3	20.0	38.4		9.0	25.4	3.8	B	9.5	8.3	8.9		9.2	51.3	7.5	
9.5	28.0	2.8		9.5	34.6	8.9		9.3	32 15.6	40.8		9.5	9.8	11.2		9.5	8 51.1	11.0	

801—860				861—920				921—980				981—1040				1041—1100			
	3h	+47°			3h	+47°			3h—4h	+47°			4h	+47°			4h	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	9 35.2	24.2	B	9.4	27 11.6	10.9		9.2	49 15.8	43.3		8.3	12 4.2	18.8	A	9.2	36 45.2	50.7	B
8.2	36.3	21.3	G	8.5	25.4	38.4	A	9.5	37.6	40.4		9.2	11.7	25.8	A	9.4	51.3	28.1	A
9.0	49.2	12.0		9.5	44.1	40.4		8.2	54.9	9.7	L	9.0	16.0	25.8	A	9.3	57.0	16.3	B
9.3	54.8	39.0		8.9	45.2	45.8	A	9.3	50 10.8	12.3		9.5	46.1	4.6		9.1	37 5.7	17.5	A
8.6	11 6.5	37.0		7.7	28 2.4	5.5	A	9.0	20.9	49.8	A	9.2	50.7	39.4		9.5	15.1	21.4	
9.3	8.3	10.9		9.5	11.3	32.5		9.4	24.6	11.3		9.5	13 1.7	28.4		9.5	29.4	3.6	
9.5	18.7	20.2		9.4	25.9	6.8		7.3	51 2.4	1.9	L	9.5	5.5	20.4		9.1	31.9	0.8	
9.0	19.3	58.0	A	8.8	29 0.6	36.5		9.2	32.6	47.2	A	9.0	27.6	39.5		9.0	41.0	58.4	A
8.3	56.2	23.7	A	9.5	31.6	49.7		8.1	56.2	4.8	A	9.5	14 5.9	54.5		9.5	52.0	25.7	
9.5	12 3.3	12.4		9.4	50.0	57.9		8.7	54.6	59.0		9.5	15 17.3	15.8		9.1	38 56.5	15.8	
9.3	57.6	47.8		9.5	30 18.7	4.1		9.2	52 45.3	39.0		9.5	52.4	15.4		9.4	39 12.9	3.9	
9.3	13 8.7	55.4		9.4	31 30.1	40.4		8.9	53.2	49.5	A	9.3	16 21.7	58.1		8.7	18.8	36.4	
9.4	12.5	44.1		9.5	31.3	57.3		8.5	54.9	11.3	A	8.0	53.4	58.2	A	9.5	40 13.6	57.1	
9.0	29.6	40.0	A	9.5	44.6	39.8		8.5	55 5.8	47.6		8.5	17 28.1	46.5	A	9.5	32.0	5.1	
9.3	32.0	26.1		9.4	32 35.3	41.6		9.0	5.8	20.7	R	9.3	18 56.9	11.4		9.3	34.5	1.0	A
9.3	14 34.6	52.1		3.5	37.1	19.6	A	9.5	56 45.6	36.5	A	9.5	19 3.1	34.5		9.0	41 7.8	8.6	A
7.3	43.2	22.3		9.4	33 42.3	1.9		9.5	57 37.6	31.5		8.5	46.5	47.8		9.3	16.4	3.5	A
9.5	51.5	0.8		8.8	48.5	0.1	A	9.5	40.8	40.9		9.4	48.0	19.2		9.5	23.6	58.3	
9.2	15 20.3	27.3		8.5	34 13.3	6.1	A	4.5	58 8.8	20.1	A	9.2	20 35.7	33.8		9.0	32.7	1.6	A
9.5	22.8	49.2		8.3	53.0	42.2	A	9.5	25.6	32.5		9.5	49.1	38.4		9.5	41.8	28.5	
7.1	59.1	52.3		7.8	35 7.6	11.0	A	9.5	33.3	37.5		9.3	21 6.9	29.9		9.4	46.2	36.3	B
8.0	59.5	42.8		9.5	23.3	9.1		9.5	33.6	47.2		8.1	33.7	58.0	A	9.5	42 9.0	34.8	
9.3	16 27.8	21.8		9.2	28.4	54.6		9.1	59 22.3	7.2	A	9.5	43.2	56 6		9.5	59.1	21.8	
9.5	28.2	11.0		8.4	49.6	31.5	A	9.3	35.5	3.1	B	9.5	22 22.4	6.5		8.3	43 0.9	42.5	A
9.5	28.8	21.1		9.5	36 15.3	23.1		9.5	47.2	18.6		9.5	30.8	11.0		9.3	35.7	44.0	
7.5	40.3	23.9		7.9	31.4	8.4	L	9.2	0 22.1	48.4		9.3	23 3.8	24.0		9.2	39.7	49.7	A
9.4	44.4	48.0		9.5	37 13.8	54.9	B	9.2	23.9	27.3		9.3	51.9	30.1		8.9	44 11.8	35.6	A
6.7	53.7	41.6	B	9.5	58.8	10.3		9.2	24.6	13.8		8.7	24 11.4	42.2	A	9.5	15.0	59.7	
8.7	17 25.0	20.0	B	9.5	38 6.5	7.5		9.5	38.5	38.7		9.5	35.7	56.3		9.4	15.2	49.4	
8.1	25.2	45.7	B	9.5	12.6	33.0		9.5	48.1	16.2		9.3	25 1.7	48.3		8.8	21.5	55.7	A
7.9	46.5	13.6	B	9.5	15.8	58.3		9.5	1 26.6	53.3		9.2	25.7	11.9	A	9.4	55.6	22.5	A
9.5	59.1	48.2	B	8.4	29.1	50.1		9.0	2 7.2	40.6	A	7.4	33.4	2.9	A	9.5	45 13.1	52.2	
7.7	18 42.8	19.3		7.5	39 10.8	31.5	L	8.7	30.9	31.5	A	7.3	34.0	4.3	A	9.4	19.5	13.7	B
9.4	44.2	25.2		8.3	21.6	13.3		9.5	3 32.7	36.2		9.4	37.9	41.9		8.5	29.0	12.1	A
7.5	54.4	47.8	B	9.5	40 12.4	19.6		9.5	34.1	6.2		8.8	26 19.3	27.0	A	9.3	31.0	24.2	
9.3	55.7	15.5		9.4	24.5	47.3	A	9.2	57.0	51.6		9.3	32.9	58.9		8.5	56.6	6.0	A
9.5	19 12.2	41.4		8.7	32.8	37.0	A	9.4	4 11.4	3.1	B	9.3	29 12.4	8.6		7.7	46 16.5	38.7	A
9.0	21.7	46.8		9.2	39.5	40.4	A	9.5	27.0	31.2		9.5	29.4	43.1		8.5	54.5	46.8	A
9.1	37.0	4.7	B	9.4	41 13.5	55.5		9.0	41.5	18.0		8.3	58.2	55.7	A	9.0	47 25.2	49.1	A
8.2	38.1	27.6	P	8.0	16.1	5.8	B	9.4	5 2.8	48.0		9.2	30 43.1	50.2		9.0	48 9.0	45.4	A
8.3	20 12.2	44.9		9.0	41.6	49.6	A	9.4	9.6	3.1	B	7.8	31 34.0	18.3	A	9.2	51.0	45.2	A
8.7	21.3	7.1	A	9.5	47.5	48.3		9.4	12.6	6.9		9.5	43.7	52.8		9.0	49 15.7	10.7	
4.8	22.0	28.1	G	9.5	50.2	45.4	B	9.5	41.0	20.4		8.3	50.8	50.9	A	9.4	47.5	53.4	
7.0	25.2	35.5	G	8.9	42 8.8	40.3	A	9.5	6 19.5	40.2		9.4	32 13.4	34.8		9.5	55.8	6.7	
9.1	25.7	2.5	A	9.3	15.1	11.4	A	9.5	44.4	1.3		8.0	57.2	53.5	A	9.4	50 27.0	4.1	
7.4	21 21.2	20.8	A	9.5	29.6	20.6		9.4	7 27.8	33.9	B	9.0	59.4	3.6	A	9.4	51 8.8	16.5	B
6.5	55.6	30.6	G	9.5	44.3	9.4		8.4	32.9	43.4	B	9.5	33 32.5	21.3		9.2	14.5	44.9	
9.5	22 26.9	59.0		8.4	43 35.6	4.0	A	9.5	8 0.2	31.6		7.0	34.0	53.7	A	9.0	52 4.0	42.3	
9.4	40.3	38.4		9.5	41.5	58.3		9.5	2.9	38.3		9.3	34 17.2	23.5		7.3	53 13.1	27.1	B
7.3	23 5.5	26.3	G	8.8	44 18.6	13.2	A	9.4	19.6	5.6		9.5	18.0	34.3		9.4	19.0	35.5	
9.2	42.1	39.9	B	9.5	24.5	50.6		9.2	43.4	11.1		9.3	39.3	42.3		9.5	25.5	27.7	
9.1	42.9	11.6	B	6.0	45 32.6	27.5	A	9.2	9 57.5	52.0	B	9.3	40.2	57.8		9.0	54 3.0	51.2	
9.5	25 33.7	59.9		9.5	45.9	53.6		9.5	10 6.5	53.7		9.4	43.8	53.3		9.5	8.9	59.9	
9.0	45.8	17.8	A	9.3	46 15.6	39.9		9.4	21.0	6.3		7.0	45.4	11.8	A	9.5	55 4.8	45.8	
9.5	50.5	43.8	R	8.4	18.3	2.4	S	9.2	34.1	8.5		8.8	55.5	25.8	A	9.0	59.5	47.3	
9.2	26 1.6	52.7		9.0	39.1	2.5		9.5	50.0	19.5		9.5	58.3	38.6		9.2	56 23.3	8.7	
5.3	12.1	42.6	A	9.2	47 22.3	12.0		9.2	56.5	59.0		9.1	35 37.6	27.7	A	9.5	50.8	58.1	
9.5	37.8	15.2		9.3	39.9	52.5		9.5	56.7	21.3		9.1	37.8	16.1	A	9.0	54.9	36.5	
9.2	55.9	1.9		9.3	49 3.5	15.1		9.5	11 4.0	23.9	B	9.1	36 5.0	30.1	A	9.5	57 36.2	8.8	B
9.3	27 11.5	47.2	A	8.1	15.3	43.9	B	9.5	8.9	33.5		9.5	41.0	50.0		9.5	47.2	52.8	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	4u—5u	+47°			5u	+47°			5u—6u	+47°			6u	+47°			6u	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	59 3.2	1.8		9.5	18 43.1	55.9		9.5	47 37.6	6.3		9.3	6 48.3	14.8	B	9.3	36 8.9	49.7	
9.2	12.5	20.1		9.3	50.8	2.7		9.5	45.6	1.4		9.4	49.8	44.5		9.3	46.4	11.6	
8.9	29.5	40.0	A	9.5	19 18.9	57.3		9.5	48 14.5	29.8		9.2	7 9.4	42.6		9.5	37 8.0	21.5	
9.2	0 26.0	39.0	A	8.3	51.9	47.5	A	9.5	45.7	50.6		8.9	8 1.3	2.9	A	9.5	38 1.5	10.1	
9.5	38.0	5.1		9.5	20 44.8	22.4	B	9.0	49 5.8	41.7		6.8	9.6	25.9	A	8.9	32.9	24.6	
9.0	1 5.5	47.3		9.5	21 3.7	28.6		9.3	41.6	31.3		8.6	18.1	11.8	A	8.0	39 8.5	11.1	A
9.0	45.0	26.5		9.5	15.9	54.4		6.0	58.1	52.0	G	8.2	9 40.3	10.2	A	9.4	11.7	46.5	
9.0	47.4	43.8		7.5	18.5	5.0	A	9.5	50 10.1	20.1		9.0	10 12.4	14.7	A	9.2	25.7	44.5	
9.4	2 54.5	35.5		9.0	24.3	14.5	A	9.3	17.3	35.8		9.2	38.5	24.6		9.2	27.7	43.8	
9.5	57.6	39.9		9.5	48.3	11.6		9.5	32.4	31.5		9.4	40.3	0.7		9.2	40 23.5	50.0	
9.5	3 19.1	51.3		9.2	22 7.4	28.0	A	9.5	39.8	27.3		9.2	12 34.5	21.4		9.0	23.9	32.5	A
8.9	22.2	1.9	A	9.5	23 47.8	14.3		9.5	42.7	31.7	B	7.8	13 37.2	11.4	A	9.5	24.2	33.6	
9.1	47.6	59.7		9.2	48.5	5.3	A	9.5	51 12.6	12.3		9.5	14 16.1	41.1		9.5	31.0	21.4	
9.5	4 3.4	51.9		7.5	24 38.4	58.7	L	9.3	26.1	43.7		9.5	16.4	17.8		9.3	31.3	13.1	A
9.0	10.5	8.0	A	9.2	48.8	3.8	A	9.1	29.7	59.4		9.4	42.7	39.9	B	9.0	43.4	32.8	A
9.5	20.8	25.9		8.8	59.2	52.8		6.7	44.7	47.7	A	9.1	15 57.3	51.5	A	9.2	41 27.6	31.8	
7.0	25.9	0.1	A	9.1	25 9.0	51.9		7.5	52 6.8	58.0	A	9.4	16 14.9	12.0		9.4	42.9	51.2	
8.9	34.7	20.1		6.0	20.3	38.7	G	9.5	26.6	4.4		9.0	49.5	13.0	A	8.0	59.0	22.4	A
9.4	48.7	42.7	A	9.0	34.9	2.8	A	9.5	30.6	26.0		7.0	57.2	29.3	A	9.0	42 29.9	33.0	A
9.4	5 5.0	43.9	A	7.2	26 20.7	51.1	L	9.3	53 12.1	9.9		9.1	17 17.4	59.9		9.1	49.3	41.0	
9.0	6 37.5	40.5	A	9.5	27 3.6	40.9		9.2	13.8	58.9		9.5	20.0	34.6		8.8	43 4.9	35.0	A
9.4	54.2	9.8		9.1	10.0	31.4	B	8.1	53.2	6.4	B	9.5	18 39.3	12.0		9.4	22.1	25.0	
9.3	7 27.9	10.0	B	9.3	50.7	59.9	A	9.5	54 26.2	35.9		9.4	19 14.5	32.7		9.5	23.1	13.5	
8.2	41.4	9.9	B	9.2	29 37.1	2.4		9.2	55 38.5	38.7		9.3	58.2	36.9		9.5	23.8	10.9	
9.3	8 0.0	35.1	A	9.5	59.8	53.0		9.1	56 16.6	16.7		9.4	20 28.3	29.3		9.5	28.7	19.5	
8.0	2.9	5.3		9.1	30 19.6	24.0		9.2	18.5	24.9		9.4	45.8	14.4	A	9.5	36.9	50.2	
9.5	4.0	17.3		9.5	31 53.1	5.4		9.1	39.7	43.1		9.1	21 8.4	43.6	A	9.3	37.0	16.5	A
9.5	26.0	49.3		9.3	32 15.0	44.2	A	9.3	53.0	32.2		9.4	23.0	14.8		9.5	44 10.9	58.5	
9.4	26.6	37.0	B	7.1	52.7	38.3	B	8.6	57 55.7	25.0		9.1	35.2	51.4	A	9.3	36.8	11.2	
9.5	42.5	54.2		9.1	56.6	33.9	A	9.5	37.3	51.4		6.8	57.9	2.1	A	9.0	44.2	56.1	A
9.1	42.9	39.5	A	9.1	33 6.1	2.4		9.3	51.3	4.3		8.0	22 25.4	18.8	A	9.5	45 43.8	8.7	
8.8	9 7.4	49.5	A	8.9	34 43.0	3.4	A	8.8	58 16.2	40.6		9.0	23 1.3	52.5		9.5	52.7	1.3	
9.5	10.0	50.3		7.5	35 25.7	51.1	A	9.0	32.1	24.0		9.5	17.5	22.3		7.9	46 27.9	26.9	A
9.5	11.0	53.2		7.5	57.1	23.6	A	9.4	51.0	4.3	A	9.2	18.4	15.4	A	9.5	47 27.4	20.7	
9.5	20.0	30.1		9.3	38 31.1	2.4		9.3	59.2	12.7		9.4	25 21.8	53.5		9.5	48 8.0	8.6	
9.3	30.5	14.7		8.4	33.2	48.6		9.0	59 0.0	2.7	B	9.4	26 0.9	41.1		9.5	49 25.0	21.5	
9.5	56.8	22.2		9.3	39 17.6	12.7		9.3	7.8	39.2		9.5	52.5	49.6		9.5	50 7.8	11.5	
9.5	57.0	7.5		8.8	19.6	14.6		8.0	22.3	43.1	G	9.5	28 4.7	59.4		9.5	8.6	0.3	
9.5	10 44.0	51.7		9.0	38.5	0.1	B	8.5	25.7	35.8	G	9.1	5.9	15.4	A	9.0	23.4	50.7	
8.9	11 52.1	46.2	B	8.2	39.6	25.4	A	7.7	59.3	32.3	G	9.2	44.0	31.7		9.5	49.9	50.2	
9.5	12 5.6	47.5		8.7	43.1	4.8	A	7.2	0 15.8	54.9	G	9.5	54.3	51.0		8.2	51 8.2	18.5	A
9.0	59.1	48.8		9.0	45.3	31.6		9.5	47.6	12.3		9.5	29 4.2	31.3		9.1	11.2	20.5	A
9.5	13 14.8	56.9		9.5	59.7	51.0		9.5	58.1	4.3		9.5	44.5	12.5		9.5	17.9	44.3	
9.5	20.0	24.6		9.0	40 46.5	54.4		9.2	1 36.9	34.9		9.5	30 2.5	13.8		9.5	54.3	2.3	
8.8	23.3	43.0		9.5	41 31.7	52.5		7.8	40.5	25.8	A	9.5	35.0	23.0		9.3	52 52.6	56.6	B
9.5	31.6	44.4		8.5	38.9	22.6	A	9.4	49.3	59.4		7.5	57.2	55.0	A	7.3	57.6	28.4	A
9.5	14 15.5	21.8		8.5	42.2	4.3		8.5	2 26.7	18.0	A	9.5	31 14.4	57.4		9.4	53 3.5	27.4	
9.5	16.6	52.3		9.5	42 16.1	21.1		9.3	3 17.8	55.4		7.5	43.5	52.6	A	7.0	13.7	16.5	A
8.8	54.2	17.3	A	9.5	37.2	59.0		9.2	47.7	15.7		9.3	32 0.6	26.9		9.0	16.3	57.2	
9.5	15 51.4	51.5		9.5	43 11.7	51.5		9.4	4 21.5	48.5	A	9.3	10.6	24.1		9.5	40.9	36.2	
9.4	16 22.4	58.9	A	7.8	57.0	5.4		9.1	23.6	19.1	A	9.1	17.1	2.0		6.8	54 16.9	58.3	L
8.0	36.2	11.7	A	9.5	44 16.6	35.5		8.7	41.3	25.9	A	9.5	33 1.5	42.3		9.0	33.0	55.6	
9.5	17 4.0	50.0		9.0	59.8	15.7		9.4	55.2	47.0	A	8.0	23.0	50.0	A	8.4	45.0	40.8	
9.5	9.5	9.5		7.3	45 25.6	40.8	A	9.3	56.7	56.7	B	9.5	34 22.9	43.8		9.2	55 5.6	28.8	
9.3	13.7	1.3		9.4	46 2.3	32.4		9.4	59.6	24.0		8.5	27.0	0.3	A	9.5	14.0	11.6	
9.5	18 6.8	52.0		9.5	24.9	42.9		9.0	5 46.7	5.9		8.0	33.5	12.5	A	8.2	15.5	17.5	A
9.5	20.1	24.9		9.5	39.6	0.9		9.2	49.3	22.7	A	9.1	58.8	53.2		9.1	23.9	46.8	
7.8	28.2	53.0	A	9.5	47.9	15.2		9.5	58.5	32.0		9.1	35 18.9	40.8		9.1	56 2.8	30.8	B
9.2	30.9	59.8	A	9.5	47 28.4	36.6		9.4	6 9.8	2.4		9.3	22.0	22.3		9.0	6.0	31.0	A
8.6	40.8	30.0		8.8	29.3	23.1	A	8.8	25.9	21.2	A	8.3	24.5	25.5	A	8.9	39.4	18.9	A

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	6ᵐ—7ᵐ	+47°			7ᵐ	+47°			7ᵐ—8ᵐ	+47°			8ᵐ	+47°			8ᵐ—9ᵐ	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	57 5.2	0.8		8.6	23 55.1	12.1	A	9.5	53 51.5	40.0		9.5	18 56.4	13.2		8.7	58 9.6	54.1	A
9.4	13.5	3.3		9.1	59.4	38.0	A	7.7	54 16.6	42.2	S	9.0	20 0.0	45.8		7.7	14.0	59.6	A
9.5	58 30.8	38.4		8.7	24 11.8	43.6	A	9.5	41.4	53.3		7.0	31.0	14.7	A	9.3	59 10.2	35.4	R
8.4	59 23.7	5.7	A	9.3	39.1	4.8	A	9.5	55 2.3	42.5		9.0	49.0	52.2	A	9.3	32.8	31.1	
8.8	37.0	17.4	A	9.5	57.3	55.8		9.5	44.1	29.6		9.2	21 7.7	55.1	A	8.0	0 4.0	35.8	A
9.4	0 28.8	54.0		9.0	26 21.4	7.4		9.5	56.2	12.7		9.1	17.3	37.1	B	9.2	54.3	26.5	A
9.4	58.4	57.6	B	9.5	22.8	42.0		9.2	56 7.5	49.9	B	8.8	21.9	4.9	A	9.3	2 22.2	53.1	
9.2	1 12.3	33.0		9.5	27 54.2	42.0		9.4	7.5	39.4		9.5	32.0	11.3		9.0	44.5	14.1	
9.5	54.2	35.7		8.3	28 16.3	24.6		9.5	41.6	16.0		9.5	43.0	36.6		9.2	3 23.5	23.2	
9.3	2 11.0	4.8		8.9	26.1	31.3		7.3	47.9	13.7	A	9.1	23 48.0	56.6	A	7.5	51.3	35.4	A
6.8	24.8	52.1	L	9.5	29 47.4	1.9		9.0	52.8	23.0		9.4	24 6.5	41.7		9.4	4 27.0	57.6	
8.5	44.7	43.7		8.7	47.7	53.0	A	9.5	59.6	13.4		6.2	18.5	37.4	A	9.5	5 0.0	36.6	
7.2	50.1	30.8	G	9.3	48.1	7.8		9.5	57 7.1	33.5		8.9	25 41.9	11.8	A	8.7	7.0	14.1	A
9.3	58.3	54.0		8.3	30 20.1	19.1		9.5	14.4	58.2		9.1	50.9	37.0	A	9.5	6 10.5	9.7	
9.3	3 32.4	13.0		8.5	23.5	0.3	B	9.1	25.1	8.4	A	9.5	52.7	39.3		9.2	42.1	56.9	B
9.2	4 10.2	29.8		9.4	32.2	35.0	A	8.0	45.3	22.6	A	8.5	27 20.9	18.7	A	9.4	7 21.7	31.8	B
9.5	23.2	29.8		8.0	31 42.1	33.9	A	9.5	55.0	43.8		8.0	21.0	36.4	A	9.3	37.5	53.1	
9.5	28.3	40.7		9.5	32 1.3	50.8		9.5	58 15.6	8.2		9.3	48.5	3.8		6.5	48.0	25.7	G
5.7	5 5.5	30.8	G	8.5	9.7	43.8	A	9.2	20.3	26.5	A	9.5	28 39.5	1.9		9.2	8 17.3	42.7	
7.2	34.9	53.1	B	9.5	33 45.2	46.0		9.3	44.9	33.8	A	9.3	39.9	3.8	B	7.2	9 32.3	34.1	A
9.5	39.3	43.2		9.2	34 32.8	35.1	A	9.5	59 49.5	35.5		9.5	41.0	17.3		9.1	35.4	17.6	
9.1	6 18.9	54.4		9.4	35 5.2	55.8	A	9.5	0 50.9	23.6		9.5	30 4.2	27.6		9.3	10 10.7	23.2	
9.4	38.7	11.5		9.0	57.8	29.6	A	9.4	52.1	14.8	B	9.5	46.1	10.3		9.5	12.0	13.6	
9.0	56.4	8.6	B	7.3	36 45.6	41.5	A	9.5	1 42.9	33.7		7.3	31 4.8	59.3	L	9.1	35.5	9.7	
9.3	7 0.7	22.0		9.5	37 25.0	36.5		7.2	43.3	22.2	A	9.0	29.5	28.4		9.4	13 2.0	1.6	
9.0	2.2	6.8		9.5	38 19.4	7.9		8.7	2 20.8	36.2	B	6.5	32 54.8	24.8	A	8.8	8.6	43.1	A
9.0	20.6	43.7		9.3	47.3	42.1		9.0	3 7.5	41.3		9.4	33 50.6	25.2		9.1	49.3	24.2	
8.3	38.5	32.0		9.5	39 51.9	12.7		9.5	31.5	25.1		9.0	35 43.6	58.4	A	9.3	58.3	19.2	
7.8	52.6	23.5	B	8.3	40 34.6	29.0	A	8.3	58.7	13.7	R	9.3	36 8.0	5.2		9.3	14 52.5	53.1	
9.5	8 41.6	37.4		9.5	41 29.0	51.9		8.2	4 16.7	43.7	B	9.4	21.5	13.6		9.5	15 13.8	18.1	
9.5	55.5	9.2		9.2	55.1	43.4		8.9	5 28.2	6.9	B	9.0	37 44.2	50.0	A	8.5	28.5	56.6	A
7.6	9 15.0	13.6	L	9.5	55.7	57.8		8.6	38.5	59.9	A	8.2	38 3.5	13.6	A	9.4	16 11.5	8.1	
9.4	10 4.2	37.9		9.2	56.1	38.8		7.0	52.9	14.2	A	9.5	36.0	44.0		9.0	17 1.2	2.6	
8.5	32.3	11.5	B	9.5	42 21.3	46.0		9.5	6 1.8	44.2		9.5	39 46.8	23.0		9.5	18 25.0	52.5	
9.0	46.6	19.0		9.5	40.8	16.0		9.5	5.3	24.6		9.3	40 11.6	54.0		9.4	19 4.0	14.6	
9.5	51.9	52.1		9.5	48.9	6.3		9.1	8.8	58.0	A	9.5	28.3	10.8	B	8.3	21.5	49.2	A
8.8	12 1.9	59.0	A	9.4	59.2	10.3	B	9.3	40.0	44.3		9.5	41 1.0	35.5		9.0	20 32.7	27.7	A
9.0	44.3	16.6	A	6.1	43 56.7	45.4	A	9.2	7 10.9	8.4	A	9.5	49.0	6.6		9.0	58.0	3.1	A
8.5	13 4.2	52.1	A	5.5	44 10.8	56.3	A	9.1	21.7	36.1	B	9.3	43 39.0	55.9		9.4	21 10.7	39.1	
9.3	48.1	27.3		9.5	26.9	10.4		6.8	8 16.6	28.5	A	9.2	42.2	50.5	A	9.5	23 26.5	16.6	
9.0	52.2	42.3		8.8	43.7	49.4	A	9.5	9 37.3	0.2		8.5	44 10.1	24.5	A	9.5	42.7	8.2	
9.0	56.0	15.0	A	8.8	51.2	52.3	A	9.5	43.0	55.1		9.0	45 17.5	28.8		9.3	24 45.5	43.4	
7.8	14 50.0	5.7	A	9.5	45 25.9	26.1		9.5	10 12.2	40.2		9.5	46 16.2	16.1		6.8	47.2	32.5	B
9.5	15 6.2	26.5		9.5	31.9	55.2		9.5	16.9	13.2		9.2	36.3	46.5		9.5	25 48.0	57.6	
9.5	18.3	6.8		9.4	42.4	21.6		8.0	40.0	52.2	A	7.9	48 21.2	18.4	B	9.5	27 39.0	59.1	
9.5	26.3	52.1		9.5	49.5	18.7		9.3	46.5	51.4	B	9.0	29.8	13.2	A	9.5	40.0	35.6	
9.5	38.4	37.9		9.5	46 31.2	1.0		8.2	47.0	51.7	A	8.7	49 15.5	7.7	A	8.4	29 12.5	4.6	A
9.4	38.8	27.5		8.4	47 31.2	28.6	A	9.5	11 8.4	1.5		9.4	50 32.0	46.8	B	9.5	30 12.8	26.5	
7.8	16 24.7	55.7	A	8.9	48 1.4	11.7	A	9.1	13.2	22.2		8.8	51 49.0	53.1	A	9.5	16.8	13.1	
9.0	17 14.3	50.7	A	7.5	49 16.2	0.4	A	9.5	12 38.4	13.6		8.8	52 0.8	55.6	A	9.1	17.2	35.8	
9.3	46.2	20.7	A	9.4	19.4	18.7		8.1	58.9	27.6	B	9.5	52.6	1.7		9.5	38.5	51.6	
7.8	18 44.5	34.7	A	9.3	50 26.3	56.2	A	8.3	13 21.9	16.2		9.3	53 9.2	50.0	B	9.5	44.0	52.1	
9.4	19 38.8	38.9		9.3	27.5	16.2		7.9	14 28.9	38.6	A	3.5	42.8	43.7	A	8.4	47.0	7.7	A
9.2	20 59.4	11.3		9.5	34.9	49.0		8.6	15 21.8	29.5	A	9.5	54 46.1	42.7		9.5	31 38.6	38.2	
8.6	21 55.8	27.8	A	9.2	46.6	8.9	A	9.5	16 6.6	35.4		9.4	55 59.7	3.7		9.5	53.2	3.6	
9.0	22 7.7	3.9		9.1	51 39.4	59.2	A	9.2	17 0.9	18.7		9.5	56 39.6	31.5		9.5	33 38.3	23.5	
9.5	10.6	19.0		9.2	52 21.3	23.0		9.3	42.6	56.8	B	8.8	57.8	42.4	A	9.3	34 1.6	2.4	
9.3	42.2	30.2	A	9.5	21.6	48.0		8.0	54.3	46.0	A	8.4	57 12.0	44.0	A	9.3	49.0	44.2	
9.1	50.6	36.7	A	9.5	35.2	17.7		9.1	18 20.9	3.9		8.4	15.2	15.4		9.2	35 3.0	2.2	
9.5	23 11.6	9.8		9.2	53 29.4	30.0		9.3	44.8	26.8		9.4	27.5	54.1	A	9.5	49.3	22.8	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	9u—10u	+47°			10u	+47°			10u—11u	+47°			11u—12u	+47°			12u	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	37 34.0	44.1		6.5	10 2.1	29.8	A	9.5	42 13.3	37.8		9.5	24 22.4	35.0		8.0	7 23.1	49.6	A
9.1	41.3	42.7		9.5	22.5	31.6		7.7	43.8	34.5	A	9.5	26.7	13.0		9.5	46.7	46.2	
8.9	44.0	55.6		9.3	27.1	47.2	B	8.8	43 5.4	3.3	A	9.2	42.2	39.3		7.3	8 2.0	54.7	A
8.6	38 11.2	14.1		9.2	12 30.0	34.0		9.1	51.0	28.2		9.2	25 32.0	24.8		9.4	18.5	45.6	B
9.2	39 7.0	33.8		9.3	50.5	34.3		9.1	44 17.8	22.2		9.1	26 56.3	23.8	A	8.6	41.4	55.6	A
9.4	7.5	25.7		9.5	13 35.2	22.2		9.5	28.4	23.7		9.5	27 46.0	53.8		9.5	9 57.8	46.7	
8.5	54.1	18.0	A	9.5	14 22.9	48.3		9.0	45 8.9	59.9		9.5	48.4	23.4		9.5	11 1.0	32.1	
9.4	40 2.3	38.9	B	9.5	15 19.2	17.2		9.5	37.0	12.7		9.5	28 32.1	26.9		9.5	30.4	36.9	
8.2	23.4	5.1	A	9.3	16 44.6	6.5		9.5	38.2	26.5		9.5	42.5	51.9		8.6	52.6	2.3	A
9.5	37.0	13.0		8.6	17 0.5	11.8	B	9.5	47 3.4	14.2		9.5	29 23.8	26.4		9.4	53.6	11.7	
9.5	44.7	23.4		9.4	2.4	26.2		8.6	31.4	39.7	A	9.5	30 24.3	38.6	B	9.5	13 8.2	49.2	
9.1	41 34.9	39.0		8.8	47.8	26.5		9.0	48 35.9	58.4	A	9.3	29.8	28.7	A	9.4	35.9	24.4	
9.4	39.8	24.8		9.5	59.9	24.7		8.3	51.0	40.0		9.4	30.1	19.0		9.3	14 9.1	28.3	
9.3	42 10.4	8.6		8.3	18 11.1	40.0	A	9.5	50 52.1	17.8		6.1	46.2	38.4	A	9.3	10.7	23.2	
9.5	41.7	54.0		8.6	23.1	27.0	B	9.3	51 9.4	23.7	B	9.4	32 59.3	25.1	A	6.5	50.1	58.6	A
9.5	43 30.2	37.7		9.4	27.8	25.9		9.3	52 3.0	23.6		9.0	34 46.3	18.8	A	9.5	15 2.5	52.1	
8.8	44 12.4	14.0	A	8.7	48.3	33.4	A	9.3	15.6	50.0		9.5	35 36.8	16.5		9.1	58.3	59.6	
9.3	27.3	38.4		9.5	19 27.7	20.2		9.1	56.2	33.6		9.3	36 14.0	57.4		9.4	17 41.0	29.7	
9.4	28.2	58.4		9.5	20 7.9	45.0		6.7	53 0.0	18.9	A	9.4	17.6	15.4		9.0	18 0.7	43.2	A
9.5	45 37.1	14.7		9.4	38.2	10.3		9.2	54.0	48.2		9.5	43.8	24.5		9.5	19 14.8	16.5	B
9.5	42.6	23.1		9.5	40.0	31.1		9.5	55 49.5	33.8		9.5	37 27.7	24.9		9.5	33.7	16.2	
9.4	43.4	25.8		7.3	22 43.8	35.9	A	9.5	57 36.6	41.4		9.2	36.0	18.5		8.8	20 8.9	42.6	A
9.5	46 22.8	39.7		9.4	51.8	11.0	B	9.4	40.9	54.1		9.5	38 26.8	13.2		8.8	46.0	36.8	A
8.5	47 47.6	59.8	A	9.1	23 29.4	58.4	A	9.4	59 56.8	35.0		9.0	40 42.7	0.6		9.4	21 25.5	32.3	
9.5	48 22.7	35.0		8.5	38.4	15.7	A	9.2	0 41.1	8.9		9.3	41 36.8	52.9		9.5	23 32.6	33.6	
8.2	41.8	38.6	B	9.5	24 23.5	0.8		8.7	43.2	20.7		9.2	42 3.5	33.4		9.0	57.7	46.1	A
9.0	49 27.4	8.1		9.4	25 13.6	49.3		9.5	1 45.6	50.8		8.7	43 35.5	51.8	G	9.5	25 30.7	24.6	
9.5	33.6	18.1		9.5	44.9	23.5		8.4	48.6	5.1		9.3	44 36.1	41.9		8.6	50.5	46.7	A
9.5	49.1	36.7		8.6	26 28.9	9.3	A	9.5	2 41.5	35.4		8.3	45 26.0	23.4		6.8	27 7.3	32.9	A
9.5	50 55.7	52.0		9.1	36.0	58.9		9.3	44.8	53.3		9.1	52.6	14.5		7.3	46.1	48.2	A
9.4	51 41.5	13.0		8.9	27 6.3	46.5	A	9.5	3 15.8	10.4		9.5	53.0	24.5		9.5	28 22.3	36.8	
8.7	52 8.6	36.3	B	9.4	43.3	22.2		8.2	34.5	20.5	A	9.3	46 56.8	9.5		9.5	24.2	24.9	
9.2	11.6	35.3		9.1	28 23.4	24.1		8.4	4 37.2	28.4		7.3	47 32.7	17.9	S	9.1	42.4	1.0	
9.5	53 13.0	48.1		7.7	29.1	18.2	A	8.9	5 8.3	44.8		7.5	38.5	16.9	G	9.5	29 25.7	34.5	
9.3	13.6	24.2		9.4	44.5	22.1		9.3	43.4	22.4		8.3	49 0.3	29.4		8.8	30 7.4	52.1	
7.2	25.9	4.5	A	9.5	29 19.4	28.4		9.3	6 35.8	22.8		8.8	43.2	21.8		8.0	7.9	29.0	A
8.5	54 11.7	50.1		6.8	31 28.0	36.1	A	9.3	41.0	2.0		9.5	50 25.5	51.9		8.9	31 51.5	35.0	
9.5	34.8	25.4		9.0	52.4	46.5	A	9.5	7 21.5	23.4		9.0	51.4	2.5		9.5	33 37.3	3.0	
9.5	55 9.6	17.5		8.2	33 20.8	23.4	A	9.5	9 37.0	49.8		8.8	52 5.0	23.8		8.3	48.8	35.0	A
8.4	51.9	16.0	A	9.2	24.3	34.3		9.5	12 19.6	37.6	B	9.2	5.6	39.8	B	9.2	34 5.4	25.1	
9.5	56 9.4	48.4		9.5	32.9	11.7		9.4	39.7	34.1		9.5	54 3.0	49.4		9.5	42.8	42.2	
9.5	32.7	33.6		9.5	34 7.9	56.0		8.5	13 20.5	14.9	A	8.8	55 20.1	14.0		8.8	49.5	13.3	A
9.4	0 2.4	12.0	B	8.7	16.4	27.4	A	9.0	14 4.8	42.8		8.0	45.5	57.4	A	9.5	35 29.8	27.8	
9.5	1 27.9	29.9		9.3	35 1.1	34.0		8.5	7.4	24.1	A	9.5	47.2	42.6		9.5	36 9.2	57.1	
9.0	2 12.0	22.7		8.4	22.7	56.0		9.5	15 29.0	59.8		9.5	57 3.3	36.8		9.4	37 31.2	6.7	
9.3	55.9	2.8	A	9.1	24.4	2.8	A	8.5	30.0	9.6	A	7.5	58 56.7	5.7	A	9.5	41.2	9.1	
9.4	3 10.5	22.6		9.0	31.0	58.4		9.1	16 8.4	59.3		9.5	59 19.3	13.7		9.5	53.1	5.6	
9.5	13.7	7.0		9.4	59.4	13.9		9.5	18.3	50.8		7.5	36.6	56.6	A	9.5	38 17.1	18.2	
9.5	20.9	33.6		9.5	36 31.1	38.4		8.3	21.0	41.9	A	9.0	0 41.1	37.9	A	9.3	31.6	39.1	
9.4	39.0	26.8		9.5	36.9	56.9		9.5	41.6	22.9		9.2	46.9	34.1		8.8	32.8	15.9	A
9.0	56.9	53.2		9.4	37 43.4	38.0		8.5	17 19.2	32.9	A	9.0	2 1.1	44.7	A	9.5	40 30.3	29.4	
9.3	4 0.0	3.3		8.8	38 19.0	15.0	A	9.3	43.7	52.4		8.8	4.8	10.7		9.5	41 12.0	44.3	
9.5	49.4	48.3		9.5	28.9	7.6		7.5	19 42.0	5.5	A	9.0	44.9	23.6	A	9.5	42 1.8	42.8	
9.1	6 49.5	14.2		9.5	33.4	26.0		9.4	20 17.1	46.9		9.5	4 21.6	33.6		9.0	15.4	15.4	A
9.3	53.8	3.2	B	9.3	39 9.2	22.8		9.4	21 11.5	36.4		7.6	46.4	23.9	A	9.5	43 1.3	18.4	
8.0	7 18.9	40.5	A	9.5	40 26.0	3.9		9.5	17.8	21.4		9.5	5 1.2	20.7		9.4	21.5	54.8	
9.3	56.0	25.8		9.5	46.4	23.8		8.8	23.0	54.9		8.8	6 30.3	31.9	A	8.0	45 39.3	33.9	B
8.6	8 0.5	30.8	A	9.0	41 19.4	24.1	A	9.5	53.8	51.3		9.5	53.1	27.3		7.0	46 40.3	27.1	A
9.5	26.0	34.1		9.5	59.4	45.4		8.5	22 2.0	3.4	B	9.5	58.4	0.3		9.1	47 29.0	37.1	A
9.4	9 26.0	16.7		9.5	42 12.5	46.6		6.8	31.3	27.0	G	7.5	7 7.6	52.1	A	7.7	49.0	33.8	A

2061—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	12ᵘ—13ᵘ	+47°			13ᵘ—14ᵘ	+47°			14ᵘ	+47°			14ᵘ—15ᵘ	+47°			15ᵘ—16ᵘ	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	47 52.3	9.9		9.5	22 20.0	14.9		8.4	3 21.4	55.3	B	9.3	47 24.0	1.5		9.0	27 53.4	3.2	
9.5	55.8	19.3		7.8	23 8.9	8.3	A	9.4	6 20.3	19.5		8.9	42.6	19.9	B	8.8	53.5	47.4	B
5.8	48 18.5	58.8	A	neb	44.8	56.9		9.3	44.0	11.0		9.5	48 33.1	23.2		9.4	28 26.1	40.3	
9.5	52.1	11.3		9.5	51.2	15.4		9.5	8 59.5	5.5		9.3	42.4	58.2		9.0	29 19.5	6.9	A
9.4	50 36.3	11.9		9.4	24 47.5	33.3		8.2	9 43.0	38.9	A	6.9	49 29.7	11.3	A	9.5	32.6	38.2	
7.9	52 29.7	10.4	B	7.2	25 50.0	59.8	A	9.5	54.8	18.5		8.8	51 22.2	2.1	B	9.4	30 5.9	50.8	
7.8	30.2	55.8		9.5	26 25.8	39.9		8.8	10 27.9	48.0	A	9.2	54.8	59.2		8.3	24.7	9.4	A
8.5	53 3.3	14.3	A	8.8	27 30.1	33.1		9.3	29.1	33.8		9.5	52 18.0	32.1		9.5	40.2	40.8	
9.3	4.5	53.3		8.5	28 19.5	7.9	A	8.4	59.3	13.5		9.3	43.0	14.9		9.5	41.5	21.3	
9.1	14.1	26.8	A	9.2	20.2	58.3		8.5	12 27.7	2.7	A	8.4	54 20.7	23.7	B	9.2	31 57.0	19.9	
9.5	55 7.3	3.0		8.9	59.1	28.1	A	9.5	13 49.3	6.5		9.2	55 35.0	1.9	A	9.5	32 32.5	7.4	
9.5	13.8	31.8		9.5	29 17.5	18.9		9.5	14 47.7	32.9	B	6.3	43.2	51.2	A	8.3	33 4.1	47.8	
9.0	56 24.3	30.8	A	9.3	30 30.5	2.0		9.5	51.6	35.9		9.0	53.5	1.9	A	5.5	38.9	17.3	G
9.5	57 4.4	23.4		9.2	32 42.8	53.8		9.5	15 35.5	45.7		9.4	56 44.6	30.2		9.3	34 23.9	9.5	B
8.0	38.4	13.9	A	9.3	33 47.0	2.5	A	9.4	16 9.1	40.1		9.3	54.2	30.6	A	6.7	24.0	24.3	G
9.4	59 9.8	26.5		9.5	56.5	2.0		8.9	17 15.4	35.6	B	9.5	57 30.8	45.3		9.5	51.2	14.7	
8.8	41.0	43.4		7.2	34 33.2	0.0	A	9.0	27.0	2.6		9.5	39.1	49.3		9.5	35 10.5	16.4	
9.1	53.0	17.4	A	9.0	34.4	27.5		9.3	43.0	35.8	B	9.0	58 19.4	20.6	A	9.1	36 2.6	35.5	
9.2	0 4.2	56.7		8.4	48.6	19.1	B	9.2	18 33.7	7.6	A	9.5	34.5	14.3		8.0	58.0	10.9	A
9.0	53.8	12.9	A	9.2	35 40.0	34.5		7.7	45.3	25.4	A	9.4	0 34.3	0.6	B	9.3	37 1.7	40.8	
9.2	1 5.1	25.2	A	9.2	41.4	38.8		9.1	19 5.8	20.1	A	9.5	1 40.8	18.8		9.0	19.5	26.8	A
8.8	52.8	10.1	A	9.1	46.4	27.1	A	9.4	8.4	33.0		9.1	55.5	8.9	A	9.2	29.6	48.3	
7.9	2 30.4	37.7	B	9.2	36 41.2	17.5	B	9.5	20 43.1	55.6		9.5	2 46.3	5.9		9.0	38 57.3	47.4	
9.0	53.0	35.2		9.4	55.2	14.5		9.4	21 26.3	9.1		8.5	54.7	26.6	B	8.0	57.6	21.3	A
9.0	3 55.8	48.8	A	9.5	37 44.8	53.3		9.5	27.8	37.8		9.5	3 26.4	46.8		8.8	39 55.0	9.4	A
9.4	4 37.9	22.9		9.5	38 0.0	9.4		8.5	31.3	16.0	A	8.3	49.5	1.5	A	8.0	41 7.8	2.9	A
8.4	5 5.8	42.8	A	8.7	32.0	7.9	A	9.4	22 5.0	30.8		8.5	5 57.7	24.3	A	6.8	42 24.7	26.3	G
9.3	11.2	26.4		9.5	39 24.8	29.4		9.5	12.1	49.7		9.0	6 27.6	43.3		9.5	49.0	9.4	
8.8	37.6	21.2	A	9.4	40 57.1	7.0		9.2	23 4.8	11.5		9.3	32.1	8.4		9.3	43 12.2	51.3	
9.1	39.3	49.8		9.3	41 3.1	31.8		7.0	36.6	47.2	A	9.5	7 28.9	58.3		9.1	28.9	33.3	
8.0	6 54.3	16.4	A	8.3	12.0	14.7	B	9.5	24 22.0	25.0		9.3	40.6	6.4		8.5	44 11.1	58.7	A
9.0	55.2	48.8		8.8	58.7	41.5	A	9.4	38.7	56.6		9.4	10 4.4	42.8		8.0	45 22.3	56.2	A
8.0	7 17.2	14.8	A	9.5	42 20.3	32.4		9.2	25 0.4	48.1	A	9.2	5.1	40.3		9.5	47 3.4	48.8	
9.4	24.0	40.2		9.0	56.4	5.7	A	9.1	26 52.6	54.2		9.5	11 24.6	43.8		9.5	41.6	19.0	B
9.5	57.6	14.3		9.3	43 31.1	53.7		9.3	27 36.2	33.7	A	9.2	26.8	3.9		9.5	48 3.1	38.3	
9.5	8 22.0	57.2	B	9.5	44 23.2	52.7		9.3	57.3	1.6		9.4	38.4	33.5		9.5	49 7.2	54.2	
9.5	34.7	57.1	B	9.5	45 1.5	21.5		9.3	28 0.1	31.7	A	8.3	14 3.6	37.9	A	9.1	50 1.6	54.2	A
9.5	9 7.5	14.8		9.5	15.3	12.2	B	6.2	48.2	25.0	A	7.5	15 51.6	27.3	A	9.5	14.7	35.6	
9.4	56.7	26.5		8.5	46.2	1.6	A	9.2	29 13.8	47.2	A	7.9	18 25.7	25.5	B	9.5	15.0	11.0	
8.3	10 27.5	30.5		9.5	47 42.0	38.6		8.2	30 33.2	22.8	B	9.5	41.0	1.4		9.0	52 41.9	49.8	
7.9	29.8	5.1	B	9.3	48 4.6	56.1		9.2	38.3	12.5		9.5	57.1	29.6		8.8	44.1	50.8	
9.1	32.0	33.1		9.2	49 41.4	49.1	B	9.5	31 27.3	39.3		8.8	19 13.6	56.3		8.0	53 59.6	32.0	A
9.4	39.3	8.1		9.3	41.6	2.1	A	9.5	33 0.1	50.6		9.5	41.5	37.3		8.8	54 7.1	54.2	
9.5	11 14.4	10.3		9.5	50 39.3	12.5		9.3	2.6	4.0	B	6.6	20 27.2	35.2	A	9.0	42.1	22.4	
9.5	34.0	30.1		8.3	47.8	6.6		9.4	34 36.5	21.3	B	8.8	21 2.9	22.6	B	9.0	47.6	40.6	
9.0	12 15.5	4.4		9.4	52 31.9	15.0		8.0	35 17.5	9.8	A	9.5	57.3	15.8		9.4	55 47.8	32.9	
9.3	24.3	30.4		9.3	39.7	34.0		8.4	20.9	52.1	B	5.5	24 4.5	43.5	A	9.4	56 23.1	10.5	
7.5	30.0	53.8	A	7.0	53 1.4	19.0	A	9.4	39.2	59.6	B	9.5	31.0	26.3		7.0	57 8.8	3[illegible].9	B
8.1	13 44.5	27.1	A	9.0	54 16.6	58.6	A	9.5	37 22.1	31.7		9.0	42.2	21.3		9.0	18.5	35[illegible]	
8.4	51.3	14.9	A	9.5	37.6	23.1		9.4	40.5	27.2		9.5	25 6.5	18.9		9.4	58 14.6	22[illegible]	
9.4	16 6.1	8.4		9.5	56 42.3	21.7		9.0	39 39.6	42.6		9.0	22.3	2.9	R	6.6	19.8	38.[illegible]	L
8.9	31.5	56.1	A	8.9	42.7	2.1	A	8.8	48.7	9.3		8.8	33.1	40.3		8.1	25.6	8[illegible]	B
7.0	52.3	44.8	A	8.4	58 25.3	16.0		9.1	40 45.9	15.7		8.9	38.6	30.9		9.4	32.7	2[illegible]	B
9.0	17 8.9	0.0	A	9.3	59 24.5	30.9		9.5	52.7	59.4	B	9.1	56.4	21.6		9.5	59 17.1	2[illegible]	
9.5	15.4	11.3		7.7	37.0	16.6	A	7.8	42 50.1	2.8	A	8.8	26 12.0	8.4	R	9.2	0 3.8	5[illegible]	
9.1	16.8	58.2	A	9.3	0 38.9	59.5	B	9.4	44 17.4	40.1	B	8.3	24.3	50.3		9.5	8.5	1[illegible]	
9.0	18 41.6	12.8	A	9.3	1 21.3	21.8		7.0	25.7	11.7	A	9.4	27.5	10.9	R	7.8	49.4	5[illegible]	A
9.2	19 3.3	31.7		7.7	36.0	31.8	A	8.7	38.9	33.1	A	9.4	38.3	31.2		9.3	2 20.6	5[illegible]	
9.4	20 14.4	53.5	B	9.4	2 2.1	12.9	B	9.5	45 2.2	15.3		9.5	27 2.0	34.3		9.5	34.6	3[illegible]	
8.7	21 5.8	33.7	A	9.0	52.0	52.5	B	6.5	46 57.5	5.7	G	9.5	14.4	59.2		6.7	42.0	5[illegible]	A

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	16ᵘ	+47°			16ᵘ	+47°			16ᵘ—17ᵘ	+47°			17ᵘ	+47°			17ᵘ—18ᵘ	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	2 57.8	28.0		9.5	33 6.8	16.6		9.1	58 44.2	25.2		8.2	22 26.1	32.4	B	6.8	44 5.8	38.4	A
8.7	3 13.5	36.8		8.0	36.1	56.5	A	9.3	57.4	30.2		9.5	45.0	7.6		8.3	34.1	47.7	A
9.0	30.4	38.0		8.8	34 5.8	12.1		9.0	59 50.2	18.2		9.0	48.9	29.9		9.5	56.0	53.3	
9.2	4 57.3	11.6		9.0	35 15.0	59.5	A	9.5	0 8.2	5.4		9.2	23 0.0	3.0	B	8.8	45 19.8	38.5	A
9.0	5 20.5	38.4		9.4	36 21.1	7.6		8.8	15.2	31.8		9.0	17.5	0.4	A	9.5	46.9	31.5	
9.5	6 7.0	31.5		9.5	37 4.3	31.5		7.5	1 1.7	10.2	A	9.4	31.3	23.3	B	9.4	51.8	46.4	
9.1	31.4	31.4		8.0	13.3	44.0	A	9.4	2 11.6	39.0		9.5	24 42.8	29.5		8.0	55.4	17.6	A
9.0	31.7	20.8	B	9.4	27.4	51.0		7.6	56.7	51.8	B	9.5	25 53.2	8.7		9.2	46 28.8	40.0	A
9.5	38.7	24.6		9.3	48.9	53.0		8.8	57.8	2.3		9.4	26 5.2	12.2	B	9.3	47 48.9	23.3	A
9.0	38.9	46.5		9.1	49.4	37.4	A	9.5	3 12.3	4.8		8.8	9.8	21.1	A	9.5	59.9	49.2	
8.7	45.4	10.9	B	9.0	38 8.6	21.7		9.3	21.9	38.9		7.0	17.9	30.9	A	8.5	48 10.5	47.4	B
8.1	51.0	55.0	B	8.7	24.0	20.5		9.5	24.7	12.2		9.4	28.4	26.5		8.5	49 9.4	58.9	
7.5	54.8	56.6	S	9.4	54.7	51.2	B	9.0	46.4	37.5		9.4	49.7	48.0		9.0	56.2	1.9	
9.5	7 34.4	54.0		9.0	39 50.1	26.4		9.3	4 37.6	21.5		9.2	27 11.7	11.6		9.5	50 10.0	36.5	
9.5	46.9	9.6		9.5	40 56.8	9.1		7.9	45.3	50.3	A	9.5	13.1	16.2		8.7	10.4	3.4	A
9.5	8 4.5	5.1		9.2	41 16.3	1.6		8.7	5 55.2	3.6	A	9.1	22.6	57.3		8.8	26.3	20.3	
8.2	9 23.1	0.4	B	9.5	19.6	50.0		8.5	6 17.7	5.0		9.5	28 29.6	1.3		9.5	51 44.9	22.5	
9.0	34.8	14.6	B	9.3	21.1	39.4		9.5	23.9	32.6		9.5	37.3	52.4		9.4	52 13.8	22.5	
8.0	40.3	57.8	B	9.0	42 5.3	3.1		9.2	54.8	16.5		9.3	29 20.8	21.5		9.2	19.7	47.0	
9.1	10 1.8	1.1	A	8.8	15.4	12.0	A	9.5	56.5	46.8		8.9	58.6	41.4	A	9.3	22.9	6.4	
8.5	27.4	14.6	B	7.5	18.1	47.5	A	8.8	7 16.5	39.9	B	8.2	30 22.5	2.3		9.5	53 0.5	27.3	
9.4	48.7	26.7		8.5	19.6	15.6	A	8.9	8 30.4	33.9	A	9.1	31 4.4	38.4	A	9.4	10.5	28.9	B
7.3	53.2	24.2	B	8.0	27.4	44.0	A	9.5	37.2	42.0		9.5	30.6	36.7		7.5	14.3	13.6	A
9.5	11 22.1	34.1		nèb	53.6	48.0	A	8.7	10 33.1	1.6		9.4	37.1	17.1		9.0	55 12.8	30.0	
9.0	12 40.3	9.1	A	9.5	43 3.3	35.0		9.3	11 12.2	1.1		9.1	37.7	51.4		8.5	16.6	9.3	
9.2	13 2.8	33.5		9.5	45 2.0	48.5		9.1	19.2	51.7		9.2	38.4	14.6		9.5	17.8	39.0	
9.2	7.8	40.4		9.1	5.8	7.1		8.8	27.4	29.7		9.0	32 13.6	24.5		8.3	44.4	20.5	A
9.4	25.4	18.6		8.3	23.8	20.8		9.1	12 9.3	31.4		9.3	38.7	34.1	B	9.3	56 5.9	38.5	
9.2	14 51.5	0.6	A	9.4	48.3	33.9	B	9.5	25.4	31.9		9.3	54.4	9.1		9.3	10.3	45.9	
9.1	15 59.9	55.2		9.5	57.0	41.6		9.0	33.6	40.3		9.5	33 15.9	39.4		9.0	15.6	10.0	
9.5	16 25.8	50.5		9.0	46 26.1	59.0	A	9.5	13 25.4	2.1		9.2	34 18.2	11.4	B	9.0	57 0.9	34.4	A
9.2	46.4	32.4		9.3	48.1	23.5		9.5	14 5.7	16.0		7.4	23.4	13.7	A	6.5	9.4	23.0	A
8.5	47.9	2.6	A	9.5	55.6	53.0		8.8	10.0	24.8		9.5	24.2	1.6		8.3	23.4	31.5	A
7.3	18 58.3	57.5	S	9.3	47 3.1	8.5	B	9.5	15 13.1	30.8		9.4	56.1	50.0		7.8	30.1	53.6	
9.0	19 20.3	11.0	A	8.8	48.3	45.8	B	9.2	35.9	28.8	B	7.8	35 19.1	19.1	A	8.8	58.9	32.5	A
9.2	38.5	14.0	B	9.3	48 0.2	57.3		9.4	48.4	37.3		9.5	39.9	12.0		7.2	58 6.7	52.3	
9.5	39.1	40.5		9.3	10.6	42.5		9.4	16 11.5	2.2		9.0	36 4.2	48.7		9.0	0 8.8	40.9	
9.5	20 16.8	16.1		9.0	44.9	39.5		9.5	15.1	30.6		9.5	37.9	39.5		8.8	11.3	22.5	A
8.6	58.3	12.0	A	8.9	49 12.8	24.9		9.2	15.6	5.7	B	9.5	48.4	5.0		9.4	1 0.1	1.4	
8.5	21 15.4	54.5		6.3	16.3	38.7	A	9.5	22.2	36.2	B	9.5	37 9.6	10.2		9.1	17.3	14.1	A
9.1	22 0.8	6.6		8.8	50 6.7	28.3	A	9.5	32.3	55.5		9.5	18.8	32.0		9.4	38.9	25.0	
9.5	53.9	26.5		8.8	9.4	41.8		8.9	36.8	48.8		8.5	47.3	24.5		9.5	2 55.8	24.0	
9.5	23 10.8	49.5		9.5	55.2	28.7		9.4	17 20.7	47.3		9.1	38 20.2	56.6		9.2	3 30.9	58.6	A
7.5	25.1	38.8		8.4	59.5	8.8	A	8.8	41.1	36.0	A	9.0	30.8	31.0		9.5	57.9	34.5	
9.4	25.2	7.1	A	9.3	51 18.8	42.5		8.8	18 39.1	3.0		9.5	37.9	57.9		9.4	4 10.3	21.0	
9.3	24 51.2	18.1		8.2	39.8	49.3	B	9.2	46.7	51.6		9.5	47.3	10.7		9.4	17.8	21.0	
9.5	25 14.4	58.0		7.2	52 3.2	35.5	A	9.5	55.4	31.5		9.5	58.4	41.9		8.9	30.1	50.3	
8.8	41.0	29.5	A	9.5	53 2.7	46.5		7.5	58.9	19.2	A	8.8	39 15.9	4.3	B	9.5	37.7	54.2	
9.3	26 7.3	32.1		8.4	26.2	11.2		7.4	19 47.0	23.8	A	9.0	18.4	10.2	B	7.5	54.2	6.0	A
9.4	41.4	25.3		8.4	26.2	19.7		7.7	49.0	9.9	A	9.3	39.8	30.2		9.5	5 17.6	30.0	
9.1	28 54.8	31.0		8.0	43.7	33.5	A	9.4	59.6	40.5		9.4	41 3.3	41.4		8.8	22.7	49.8	
9.5	29 9.2	50.2	B	8.3	44.4	3.3	B	9.5	20 10.7	42.4		9.3	41.1	4.2	B	8.3	6 9.7	3.0	A
9.0	43.9	12.6	A	9.4	47.2	48.8	B	9.3	11.7	2.3		9.0	47.9	6.3	A	9.4	35.4	32.0	
8.2	44.8	33.4	S	8.3	52.2	18.7		8.4	38.4	11.6		9.5	48.2	56.7		9.5	7 1.5	43.9	
9.0	30 8.4	27.5		8.0	53.4	33.9	A	9.5	51.9	16.6		9.5	42 48.7	54.3		9.2	11.6	6.7	
8.8	48.8	21.5		9.5	54 19.2	26.9		8.5	54.7	9.0	A	9.0	56.8	27.0		8.0	40.9	38.4	A
9.0	31 6.3	3.1		9.3	25.4	30.9		8.8	57.8	54.3		6.2	43 14.9	40.9	A	9.5	50.8	55.8	
8.8	27.4	58.4	A	9.3	56 3.8	38.8		9.5	21 47.3	18.0		9.2	28.7	14.6		9.5	58.2	30.5	
8.3	32 1.7	6.6	A	7.5	15.7	5.2	A	9.4	54.5	45.4		9.3	58.6	27.0	A	9.5	10 13.8	54.2	
9.5	47.9	54.0		6.6	58 31.0	15.3	B	9.1	22 14.8	31.0		9.5	44 1.5	56.5	B	8.0	24.3	11.0	A

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	18ᵘ	+47°			18ᵘ	+47°			18ᵘ—19ᵘ	+47°			19ᵘ	+47°			19ᵘ	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	10 36.9	34.0		8.1	31 48.6	1.4	A	9.3	52 43.8	20.6	B	9.1	8 23.9	49.6		7.8	24 14.9	28.7	B
9.5	49.4	26.5		9.5	32 11.2	56.2		9.4	57.9	17.2		8.8	39.8	32.1	A	9.4	18.9	59.0	
9.2	57.0	7.2		9.5	26.5	11.2		9.5	53 3.7	23.6		9.2	53.3	52.3	A	8.6	34.5	31.1	
7.2	11 41.4	31.0	A	9.4	29.9	35.5		9.2	21.9	22.2		9.5	9 45.0	58.5		9.3	40.1	47.6	
9.5	47.5	42.0		9.5	44.7	55.2		9.4	29.5	9.5		9.5	51.6	52.4		9.3	41.3	38.7	
9.5	12 11.9	26.6		8.5	50.4	50.0		9.5	40.9	57.0		9.2	10 6.0	30.8	B	9.5	52.4	40.2	B
9.0	24.8	27.6	A	7.5	33 42.3	51.0		8.2	54 0.6	13.5	B	8.8	49.1	26.7		9.5	25 24.5	1.1	
8.0	51.0	54.9	A	9.5	34 27.0	38.5		9.1	8.0	27.4	B	8.8	49.6	42.6		8.5	34.2	6.7	
9.3	13 13.9	55.4		9.3	35 7.4	49.0		9.0	9.9	18.2	A	8.4	55.8	3.7	A	8.5	26 0.4	24.2	
9.4	14 36.6	11.2		9.3	9.9	23.6		7.9	26.9	39.1	A	8.8	11 23.4	37.1		8.5	0.8	32.6	
9.1	15 7.0	30.4		9.5	32.1	28.1		9.5	50.4	56.0		9.3	37.8	55.0		9.4	5.8	56.1	A
8.2	24.4	20.6	B	9.5	40.4	33.3		9.1	55 8.7	3.4		8.5	12 8.4	55.6		8.2	24.3	54.0	A
9.5	16 5.5	22.6		9.5	36 6.6	16.8		9.2	53.9	44.1		9.5	26.5	20.2		8.8	32.9	6.4	
9.5	6.8	4.8		9.5	9.4	11.8		9.3	56 7.0	13.2		8.0	30.9	12.0	B	6.7	27 5.4	11.1	A
9.5	43.5	52.2	B	9.1	18.4	12.3	B	9.4	21.4	16.2		8.9	36.7	56.4		9.5	8.9	32.6	
8.8	45.4	1.4	A	9.5	49.8	50.6		8.8	36.5	38.6		8.6	36.7	50.4	B	9.3	57.8	23.9	B
9.4	45.9	15.6		8.8	37 5.0	18.6		8.9	55.2	29.2	R	8.4	40.0	45.6		9.3	28 0.5	12.2	
9.3	17 0.0	40.4		9.3	20.5	42.5		9.5	57 9.6	28.7		8.4	44.6	24.7		8.6	6.9	33.1	A
9.0	8.9	42.9	A	9.0	54.6	9.1		7.2	10.2	49.0	G	8.9	55.7	52.4		9.5	19.2	14.7	
9.3	11.0	56.0	B	9.5	38 1.7	41.0		9.5	12.2	9.3		8.8	58.4	35.1		8.9	25.9	43.6	A
9.2	15.8	30.5		6.3	53.1	26.1	G	9.0	44.4	27.4		7.7	13 29.1	41.4	B	9.5	29 28.5	49.0	
9.4	20.4	38.5		8.8	39 32.0	34.0		9.1	46.5	45.1		8.3	32.2	49.3	B	9.5	34.8	52.8	
9.2	39.9	5.4	A	8.8	46.5	47.0		7.8	58 8.2	5.1	A	9.5	14 32.0	21.7		9.3	38.0	13.2	
9.1	18 13.0	42.4	A	6.6	57.4	28.1	A	9.3	30.2	21.7		9.5	36.2	2.4		9.4	46.5	43.5	
9.0	15.2	29.6	A	9.0	40 18.2	32.5	A	9.2	40.9	43.5		8.8	15 34.9	28.7		8.7	48.8	44.1	A
8.7	49.1	7.8	A	9.5	19.2	5.2		9.0	46.7	33.1		9.0	55.8	14.7		9.5	55.0	53.0	
9.2	54.3	52.7	R	9.5	55 9	57.9		9.3	59 22.3	54.3		9.5	16 25.4	56.5		9.2	30 5.7	33.1	
9.0	19 21.0	41.0		9.5	41 9.5	37.5		9.5	36.6	14.2		9.0	44.9	16.2		9.5	28.4	31.6	
9.5	23.5	58.6		9.5	22.0	8.7		9.2	52.9	33.6		9.5	58.7	25.1		9.5	28.5	43.5	
9.4	56.3	7.2		9.5	22.4	57.1		8.9	55.9	26.2		9.2	17 6.3	18.5		6.5	34.9	50.9	A
9.0	20 35.9	10.7	A	9.3	55.9	55.9		9.5	0 4.9	32.1		9.2	10.4	43.1		9.3	45.2	4.0	
9.1	37.6	48.1	B	9.5	42 5.6	14.5		9.4	36.3	48.0		8.8	18.7	20.1	B	9.4	59.0	36.6	
8.8	44.9	7.8	A	9.5	11.3	19.8		9.5	44.9	17.7		9.5	38.8	51.0		7.3	31 20.8	8.1	A
8.5	47.7	28.6		9.4	55.0	9.4		9.4	46.9	32.1		8.3	39.3	8.3	A	9.4	32 11.6	48.6	
9.5	21 6.6	3.2		9.3	43 24.4	7.9		9.5	1 22.7	3.4		9.4	39.4	6.6	B	9.5	20.0	19.7	
9.0	22 0.4	14.1		9.2	27.4	2.0		9.2	28.4	14.2		8.1	42.6	12.1	B	9.5	23.1	9.7	
8.5	23 2.9	17.1	A	9.5	48.0	14.3		9.0	39.4	24.2		9.0	18 28.6	43.1		8.8	24.9	51.7	A
9.3	31.5	57.2		8.8	44 7.6	4.5		8.6	46.9	35.1		9.0	30.7	50.1		9.3	25.6	39.6	
9.5	39.9	31.0		9.4	20.3	23.5		8.8	2 30.4	51.5		9.4	49.9	36.1		9.0	28.7	57.7	
9.5	50.4	40.0		9.5	24.5	18.8		9.5	36.8	58.6		8.3	52.4	26.2	A	9.5	33 34.6	29.7	
9.5	24 56.5	54.0		9.5	46.5	24.3		9.5	51.5	55.3		9.1	19 17.9	21.7		9.5	34 8.0	17.2	
9.5	26 43.2	23.6		7.2	45 11.0	20.8	A	9.5	4 35.2	17.7		9.2	27.9	26.2	A	9.3	21.0	33.1	B
9.5	27 33.4	41.0		8.8	33.3	33.2		9.0	43.0	8.7		7.5	28.7	46.7	L	9.3	22.1	3.5	
9.0	55.1	50.3	A	8.9	39.7	3.5	A	9.2	5 8.6	38.1		9.5	20 5.4	17.2		9.5	39.1	48.1	
8.8	28 10.4	11.6		9.1	45.8	56.4		9.1	46.1	42.5	B	8.3	10.3	7.4	A	9.4	43.1	34.6	
9.2	16.3	18.1		9.5	47.0	28.2		8.5	46.5	30.0	A	9.4	38.7	55.0		9.4	49.2	20.5	
9.0	47.7	13.7	A	8.8	57.2	28.3	A	9.5	6 23.2	5.9		9.5	50.9	20.2		8.4	35 1.3	23.2	
9.4	29 2.7	24.1		9.5	46 37.5	21.8		9.5	32.8	44.1		8.6	54.1	30.7	B	9.0	5.0	12.0	A
8.0	4.9	20.6	A	9.5	47 5.4	25.0		9.5	53.7	6.7		9.3	21 29.9	12.7		9.0	7.9	35.6	
9.4	49.5	15.3		9.4	19.0	26.3		9.3	54.6	45.1		9.1	34.3	43.3		8.5	13.5	41.6	
7.6	30 0.8	44.9		9.5	33.9	30.7		9.0	59.4	54.0		9.5	52.4	11.2		8.6	15.7	7.7	A
9.2	1.0	14.3	B	9.4	49 21.4	21.3		8.8	7 26.9	33.6	A	9.5	22 10.4	7.4		9.3	26.9	43.1	
8.2	4.6	0.3	A	8.2	37.5	2.9	L	8.9	36.4	39.2	B	7.0	23.8	41.1	A	9.3	27.4	48.6	
9.3	20.9	23.6		9.0	50 49.2	44.2		9.5	38.7	26.7		9.5	37.4	44.1		9.5	48.7	17.2	
9.2	23.7	32.0		9.4	57.3	5.3		9.5	39.5	1.4		9.4	51.0	37.6		9.5	36 4.5	49.1	
9.1	26.5	46.9		9.5	51 15.6	32.5		9.0	53.4	42.7		9.3	23 31.6	3.1		9.5	26.9	29.1	
8.0	31 18.4	19.1	A	9.5	26.0	1.9		8.6	54.0	48.6		7.3	36.9	14.2	L	8.7	32.7	4.7	A
9.3	24.2	27.6		6.9	33.1	15.3	B	8.9	55.5	58.3		7.7	45.8	52.5	A	9.1	37 2.4	43.6	
8.2	40.0	8.8	A	9.2	52 22.8	30.5	A	6.5	8 11.2	8.4	G	8.5	51.2	57.4	A	9.0	6.9	18.7	
9.3	40.0	0.9		8.4	36.9	27.9	B	8.6	16.0	52.3	A	9.4	24 13.6	52.1		9.5	27.4	37.6	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	19ʰ	+47°			19ʰ—20ʰ	+47°			20ʰ	+47°			20ʰ	+47°			20ʰ	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.5	37 40.6	53.4		9.2	52 25.3	52.1		9.5	2 45.7	22.9		9.5	15 46.4	49.3		9.0	29 24.8	33.8	A
9.5	38 18.6	50.5		9.5	42.2	1.2		8.0	58.6	46.3	A	9.1	59.5	57.5		8.9	53.2	50.2	A
8.9	29.4	33.1	A	9.5	48.2	1.5		9.5	3 9.7	35.4		9.2	16 16.5	34.8	A	9.5	30 18.6	33.8	
9.5	39 14.4	50.1		9.1	49.9	8.7	A	9.0	30.0	32.3		9.5	44.3	4.2		8.9	19.4	58.2	A
9.5	58.7	4.4		9.5	53 34.7	11.9		8.1	31.5	7.5	B	9.5	45.8	57.2		8.7	31 7.2	30.4	A
9.5	40 28.8	21.0		8.0	54 15.4	40.1	A	9.4	4 7.5	50.8	A	9.4	17 16.0	47.0		9.1	16.8	32.3	
9.5	29.6	15.6		9.0	16.0	37.0	A	8.9	37.4	48.7	A	9.5	43.4	5.9		9.5	40.3	56.5	
9.5	32.1	34.0		9.2	43.4	24.8		9.5	38.3	10.2		9.4	43.8	0.4	B	9.5	32 30.8	12.4	
9.5	40.4	34.0		9.0	50.5	28.1	A	9.2	44.2	53.2		8.5	45.2	18.4		9.4	31.3	37.3	
9.1	41 5.8	4.7		8.9	59.3	30.7	A	9.4	46.5	59.7		8.6	18 13.3	19.9		9.4	53.5	18.9	
9.5	34.2	59.5		9.2	55 7.9	3.0	A	9.3	5 2.7	25.4		8.7	25.1	5.7	B	9.5	33 9.6	32.8	
9.1	40.9	36.2	B	9.5	10.5	17.5		9.0	2.9	57.2	A	8.8	40.2	1.6		9.0	9.6	25.4	A
9.5	56.4	29.7		9.5	26.9	54.9		9.5	11.2	1.4		8.8	46.4	37.8		8.5	11.5	25.8	A
9.1	42 46.0	10.7	A	8.9	51.0	12.5		9.5	15.8	24.9		9.5	19 25.3	20.9		6.8	39.0	34.3	A
9.3	43 5.2	14.2		8.0	52.8	33.0	A	9.4	30.5	59.2		9.4	33.0	17.7		9.2	34 4.0	58.2	
5.8	14.3	34.1	A	9.2	57.0	10.2		9.0	44.9	44.9	A	9.3	33.5	15.7	B	9.4	4.3	42.3	
9.0	25.9	12.2	A	8.6	56 11.5	46.4	B	6.4	6 12.2	48.3	A	9.5	42.8	22.9		7.9	14.6	10.6	B
9.0	36.0	29.1	A	8.7	14.0	54.3	B	8.5	25.4	20.0	G	9.5	44.2	31.3		8.5	50.2	41.8	A
9.3	46.9	43.3	B	9.0	18.5	47.4		9.4	35.7	1.0		9.5	44.7	41.3		7.8	58.3	3.7	A
9.3	47.4	15.7		9.3	22.2	20.0	B	9.5	53.8	33.8		9.5	20 29.8	1.2		8.5	35 0.5	35.3	A
8.9	48.4	28.7	A	9.3	31.7	46.5	B	9.1	57.5	2.0		8.8	32.8	12.4		9.5	15.5	4.0	
9.1	57.5	22.2	A	8.2	44.9	51.5	S	9.0	7 9.2	13.9		9.4	33.7	24.9		9.5	19 8	34.8	
9.5	44 5.6	46.6		9.0	52.3	56.3		9.4	10.3	0.4		8.5	40.7	27.9	A	9.2	44.3	10.8	A
9.5	6.0	51.0		8.7	57 7.4	54.7		9.5	21.8	46.3		9.1	21 18.5	55.7		9.4	53.3	8.4	
9.1	7.9	23.2	A	8.2	11.5	3.4	A	7.5	37.7	17.9	G	9.3	24.0	10.2		9.5	36 7.9	14.4	
9.2	27.0	44.6		9.5	18.7	59.3		9.5	44.9	37.3		8.8	25.8	30.8	A	9.5	16.4	57.2	
9.4	39.7	2.4		9.5	40.4	19.0		9.5	8 1.3	19.9		8.0	26.0	27.9	A	9.5	28.3	46.8	
9.3	51.9	29.7		9.4	59.8	47.8		9.2	6.7	4.8		8.8	40.0	25.9	A	9.5	37 18.2	1.8	
9.1	58.3	3.7	A	9.5	58 22.2	42.8		8.3	9 13.4	42.3	A	9.0	51.7	3.2	A	8.0	36.1	5.5	A
9.2	45 4.1	35.1		9.0	29.3	47.3		9.5	23.5	13.9		9.5	59.3	13.0		9.0	38 6.7	22.9	
9.2	4.4	25.2		9.0	37.1	38.6	B	9.5	44.2	17.4		8.8	22 28.2	9.5		9.4	6.9	57.7	B
9.1	15.0	45.6		8.6	47.0	35.3	A	9.5	10 10.0	57.7		7.8	30.3	25.9	A	9.0	16.3	11.9	
9.0	52.6	25.7		8.6	50.0	37.8	A	8.0	14.9	16.9	A	8.5	56.4	47.9	A	9.4	20.0	3.9	
9.2	54.7	7.4	A	8.7	54.2	29.9	A	7.8	16.7	0.2	L	8.1	23 36.2	46.3	A	9.0	24.0	16.9	
9.3	46 21.2	25.7		9.5	59 4.5	53.2		9.4	34.7	32.1	B	8.3	36.2	36.8	A	8.6	27.5	24.4	
9.3	32.4	42.1		9.0	11.3	22.9		9.5	35.0	21.6		9.3	45.8	28.8		9.5	57.1	9.9	
6.2	47 0.3	1.7	A	9.1	13.5	11.8		9.0	37.9	3.5	A	7.2	24 9.8	8.2	A	9.2	39 0.6	0.0	A
9.3	23.1	1.1	B	9.5	22.7	32.8		9.0	46.6	6.2	A	9.0	18.6	45.3	B	9.2	16.5	27.9	
5.8	52.8	35.2	A	9.5	23.5	46.3		5.0	59.9	16.4	A	8.1	20.7	7.2	A	8.8	40 18.1	10.5	A
9.3	48 12.0	31.5		9.5	34.0	27.9		8.9	11 1.7	12.9	A	8.1	25.0	44.9	A	8.4	42.2	44.3	A
9.3	13.5	30.6	B	9.3	40.0	38.8		8.3	11.3	9.8	A	9.3	30.6	49.5		9.5	59.4	6.3	
9.5	16.3	36.6		8.8	53.7	56.7		8.8	28.7	44.8	A	9.5	34.5	21.9		9.2	41 5.3	41.2	B
7.6	23.0	44.6	A	9.5	0 4.2	32.3		9.4	38.4	59.9	A	8.7	39.2	3.9	A	9.4	45.2	33.8	A
9.5	24.0	29.6		6.2	9.7	49.2	A	8.5	12 27.9	23.0	A	9.4	41.2	41.8		8.3	49.2	44.8	A
6.8	46.4	27.2	A	9.4	26.0	10.0		9.1	42.8	3.5	A	8.5	25 1.8	56.8	A	9.5	42 1.5	12.4	
9.5	49 23.3	5.7		9.5	37.7	22.4		9.5	47.2	15.4		9.2	14.7	34.8	A	8.8	34.8	58.2	
9.5	26.7	20.1	B	8.8	38.3	57.0	A	9.3	48.0	27.4		8.8	20.1	36.8	A	8.5	43 1.7	58.6	A
7.8	33.9	55.4	A	8.9	42.9	8.2	A	9.4	56.7	25.9		9.2	20.2	0.3	A	5.5	4.5	17.9	A
8.0	50 13.8	33.2	A	8.5	45.7	45.8		9.2	13 1.9	57.8		9.0	54.0	21.9	A	9.2	7.5	24.8	A
9.0	25.7	3.0		9.5	49.5	3.8	A	9.4	8.8	3.8	B	9.3	26 38.2	2.8	A	9.2	21.7	18.2	B
8.8	29.9	22.7	A	8.0	52.6	55.2	A	8.8	11.8	52.7		8.5	27 20.1	50.6	A	9.2	35.5	31.7	A
6.7	45.6	10.3	G	9.4	54.6	7.8	B	9.5	14 1.7	52.2		8.5	34.0	16.9	A	8.0	44 5.0	40.8	A
9.4	47.6	31.1		8.9	58.5	4.3	A	9.3	16.5	30.5		9.3	35.4	27.9		9.2	50.2	32.8	A
9.3	51 2.7	21.1		9.2	1 10.3	4.9	A	9.1	19.9	30.0	B	9.3	41.7	44.9	B	9.5	45 9.5	9.5	
9.0	14.3	0.1		9.5	11.1	7.5		9.5	59.8	3.2		8.4	47.8	53.2	A	9.5	22.1	0.1	
8.6	17.7	49.2	A	9.5	16.3	40.8		9.5	15 4.6	17.4		7.5	51.7	43.8	A	9.5	35.4	55.2	
9.3	32.0	17.6		9.5	16.7	48.8		8.5	10.0	25.8	A	9.5	58.6	44.5		9.5	40.0	0.1	
9.5	34.0	3.4		9.5	2 9.2	50.7		8.3	12.5	27.4	A	9.5	28 4.0	57.9		9.5	51.5	8.9	
9.5	52.4	4.4		9.4	23.3	10.5		9.5	19.6	8.7		9.5	40.8	47.3	A	8.8	46 0.5	23.8	A
9.5	52 19.0	11.1	A	9.5	34.7	35.8		9.5	46.0	43.8		9.5	41.0	58.7		7.0	11.5	28.8	A

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	20ᵘ	+47°			20ᵘ—21ᵘ	+47°			21ᵘ	+47°			21ᵘ	+47°			21ᵘ	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	46 38.3	13.9	A	9.4	57 2.9	25.3	B	7.8	5 27.9	4.0	A	6.7	16 21.5	32.9	A	9.4	25 44.4	9.9	B
7.5	42.6	9.7	A	9.4	4.6	55.3		7.0	29.7	6.2	A	9.2	47.4	34.5		9.4	55.6	26.2	
9.5	56.0	29.3		9.5	8.6	23.7		9.4	47.9	24.5		9.1	17 8.8	44.6		9.4	26 0.4	25.6	
9.0	47 5.8	2.9	A	7.8	7.8	2.7	A	9.4	54.0	4.2		9.2	53.9	41.7		9.4	3.5	3.0	
9.0	30.5	30.4	B	8.4	13.0	24.6	A	9.5	56.8	57.8		9.5	56.8	55.2		9.4	6.1	49.0	
9.3	39.9	29.7		7.0	39.9	27.6	A	9.2	6 7.6	17.0		7.7	18 0.0	54.0	B	7.0	9.3	43.1	A
9.5	40.0	2.9		7.9	56.5	56.7	B	9.0	33.3	25.2	A	8.1	6.1	26.9	A	9.3	14.5	37.4	
9.2	50.5	20.4	A	9.4	58 10.2	8.3		9.5	52.2	27.2		9.0	17.8	38.1		7.4	17.3	38.5	A
9.4	57.4	26.6		9.5	13.5	46.3		9.5	52.9	51.7		9.5	19.2	31.5		6.3	29.7	56.6	L
9.5	48 4.9	40.8		9.3	16.1	37.0		9.5	7 3.8	7.1		9.5	27.6	19.2		9.4	31.4	25.2	
9.4	13.7	22.9	A	9.5	43.1	57.4		9.5	17.0	45.6	B	9.5	34.4	54.5		7.9	31.6	50.8	B
9.3	28.4	7.2		8.9	44.4	53.8		9.1	21.4	21.8		8.5	41.0	45.9	A	8.8	36.5	50.6	
9.3	36.1	14.0	A	9.5	59 6.2	4.2		9.4	22.4	54.1		9.4	45.8	17.3		9.0	40.8	42.1	
7.5	39.5	43.3	L	9.5	19.3	58.3		9.2	39.7	26.6		7.8	54.9	4.9	A	8.6	49.4	41.8	B
9.0	49 12.0	58.9		9.5	22.9	32.7		9.5	46.9	44.2		7.1	58.7	56.3	A	8.0	51.4	55.6	B
7.7	14.4	52.9	L	8.3	23.2	31.3	A	9.2	50.0	42.3		8.8	19 25.0	23.8		9.1	57.6	50.7	B
9.5	25.5	5.3		9.4	29.7	50.0		9.5	8 9.0	16.7		9.5	40.2	41.6		6.5	27 3.8	48.0	A
8.2	30.6	50.5	B	9.5	48.9	12.6		9.5	10.0	47.3		8.4	20 6.3	56.9	A	8.5	4.3	42.2	A
9.4	33.6	0.1	B	9.5	51.3	37.3		9.5	39.3	55.5		9.5	10.5	40.8		9.5	11.5	28.5	
8.8	46.6	12.1	A	9.2	57.2	33.3		8.3	41.1	27.6	L	9.5	23.8	3.7		9.2	18.8	20.2	
9.5	50 3.7	39.3		8.7	59.8	17.2	A	9.5	57.6	51.8		9.5	27.7	56.7		8.5	24.5	19.0	B
8.8	28.1	7.1	A	9.4	0 26.3	19.9		9.5	9 35.9	53.5		9.5	41.6	24.8		9.0	28.9	50.5	A
9.5	49.3	55.8		9.5	35.9	23.5		9.5	46.2	8.9		9.5	49.1	29.7		9.4	39.5	8.5	
9.2	53.7	6.9	A	7.6	45.4	13.3	A	9.2	54.0	27.0		8.1	51.7	2.2	A	9.3	41.6	18.6	
9.3	54.2	29.8		9.4	49.8	52.1		9.5	10 19.1	44.3		9.2	21 1.9	41.8		9.2	46.0	36.3	
9.3	55.0	21.4		7.1	58.9	27.6	A	9.3	22.2	49.3	B	9.2	5.1	29.0		8.5	49.6	24.4	
9.3	51 24.4	16.7		9.5	59.6	56.9		9.4	27.6	50.1		9.1	12.0	22.0		8.4	53.8	8.9	B
9.5	29.5	16.9		9.5	1 15.6	19.7		6.3	33.2	22.2	A	9.5	19.4	0.9		6.5	55.5	39.4	A
9.4	35.5	2.8		9.3	22.4	16.5		8.5	39.7	55.5	A	8.7	30.2	8.7		9.5	28 27.7	50.1	
9.2	37.4	43.9	B	9.2	22.5	35.4	A	9.2	55.4	14.0		9.1	31.7	56.6		9.5	32.5	32.9	
9.2	44.6	15.8	B	8.8	36.2	48.0		9.3	11 7.1	23.0		9.5	22 0.8	50.1		9.0	35.3	24.4	
9.1	46.8	33.5		4.6	36.7	3.9	A	9.5	13.5	49.4		8.1	10.5	32.7	B	8.8	39.6	54.4	
9.0	47.4	20.5		9.5	37.3	11.7	B	9.1	16.6	44.8		7.9	16.3	10.4	B	9.1	46.6	58.9	
8.0	52 3.5	1.4	A	7.3	45.6	36.4	A	9.5	32.4	52.5		9.5	27.2	20.1		9.4	48.0	21.1	
9.3	8.2	41.1		9.1	2 4.8	15.3		9.5	56.3	50.1		9.2	34.5	11.0		9.5	54.7	56.7	
9.5	24.8	11.6		9.5	5.5	39.8		9.4	12 5.4	48.9	B	9.5	36.0	31.7		9.5	56.5	29.8	
8.3	26.4	44.2		7.3	13.9	9.0	A	8.4	14.2	26.9	A	9.2	47.1	12.6		8.9	29 6.4	34.9	
9.2	39.2	17.0		9.2	34.0	44.2		9.1	19.7	25.8		8.0	23 1.7	19.4	B	9.5	32.6	14.0	
9.3	41.5	59.6		9.5	37.5	11.8		9.4	37.5	49.0		9.5	4.5	35.0		9.4	36.1	32.9	
7.5	53 21.0	3.3	A	9.5	44.8	6.0		9.5	47.8	57.7		7.4	14.2	48.1	L	8.9	57.4	47.5	
8.8	44.7	0.0	A	9.4	3 9.4	6.5		9.5	13 16.4	28.6		9.2	24.0	25.1		8.5	30 12.5	51.0	
9.5	48.5	27.2		9.5	25.0	5.4		9.5	23.7	40.2		9.0	27.6	45.3		9.5	12.9	31.2	
8.3	54 4.2	5.2	A	9.5	25.8	31.5		9.2	24.1	10.5		9.0	30.0	38.2	B	8.9	18.8	16.2	A
9.4	24.1	13.6		9.5	26.5	24.8		9.4	42.2	57.4		9.5	39.6	31.7		9.5	24.6	9.4	
9.2	25.3	39.0		9.5	35.0	20.1		9.5	14 4.0	1.5		9.5	54.6	36.0		9.1	29.1	27.4	A
8.9	26.3	44.7		8.5	54.2	39.3	A	9.4	16.3	6.1		9.5	24 1.7	22.8		9.5	29.5	27.0	
9.5	54.0	9.4		9.0	56.6	39.5		9.5	18.9	20.0		8.9	9.7	17.4		9.1	32.8	15.8	A
9.3	57.6	52.2		9.3	4 6.4	24.3		9.5	25.4	26.8		9.1	27.3	22.8		9.3	44.2	35.5	
9.5	55 26.2	46.7		9.3	7.3	1.6		9.3	32.0	6.7	B	9.5	29.1	55.5		8.2	31 1.2	59.3	A
8.9	35.7	56.7		9.5	22.3	11.3		9.4	41.6	25.3		9.5	25 0.0	2.3		9.4	4.1	51.8	
9.1	44.4	12.7		9.3	24.0	39.3		9.4	48.5	40.4		9.3	4.6	58.6		9.5	14.1	45.1	
9.4	55.8	3.1		9.2	44.0	12.5		9.0	59.7	34.8		7.0	6.2	45.2	L	9.5	22.6	26.0	
9.0	56 0.9	26.2		9.3	46.1	45.0		9.3	15 4.9	10.7		8.5	19.5	39.5		9.5	28.5	24.6	
9.4	6.4	53.1		9.5	46.6	2.8		8.1	19.2	15.8	B	9.4	21.5	4.9		9.5	29.2	49.4	
9.5	11.7	52.4		8.8	55.9	34.2	A	9.4	24.1	25.9		9.1	30.5	27.1		9.5	38.2	9.2	
8.4	43.2	21.0	A	9.0	59.1	9.4	A	8.6	40.4	38.1	A	7.9	30.5	2.0	B	9.1	50.5	3.6	
7.9	51.6	15.0	A	9.2	5 10.2	33.2	B	9.5	16 4.3	14.7		8.1	30.9	13.6	B	9.2	50.8	0.2	
9.5	57.7	28.3		9.5	10.6	24.9		9.4	7.6	40.5		8.5	32.0	41.5		9.2	51.4	54.4	
9.5	57 0.5	9.5		9.4	20.2	52.5		9.5	8.9	26.5		8.5	34.1	50.0		9.2	54.5	41.4	
9.2	2.4	56.5	B	9.4	21.8	16.5	B	9.5	13.4	51.6	B	9.5	37.3	50.5		8.9	58.1	46.2	A

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	21ᵘ	+47°			21ᵘ	+47°			21ᵘ	+47°			21ᵘ—22ᵘ	+47°			22ᵘ	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	32 17.9	28.0		8.8	43 18.7	50.0	A	9.5	51 43.4	9.5		9.5	58 34.5	38.8		9.5	8 7.3	12.7	
9.5	33.5	21.6	B	9.1	21.6	40.3		7.5	53.6	20.9	A	9.5	34.5	46.7		9.5	10.8	36.9	
9.5	38.4	37.5		9.5	29.4	16.5		9.5	58.0	27.5		9.5	53.8	36.9	B	9.5	55.1	48.6	
9.5	39.0	44.5		9.5	32.3	22.5		9.3	59.9	34.2		9.3	59.7	54.8		9.5	9 32.5	15.3	
7.8	41.1	50.0	A	8.0	46.3	46.1	A	9.5	52 11.3	24.1		9.0	59 5.5	58.4		9.3	47.0	26.6	
9.5	44.1	48.6	A	9.0	44 1.1	49.6		9.4	12.7	7.4		9.1	27.4	22.4		9.5	48.2	36.6	
9.5	55.4	0.2		8.9	6.2	15.3		9.4	14.9	35.0		9.3	32.4	27.1		9.5	50.5	43.9	
9.5	33 2.6	9.2		9.3	21.3	11.5		9.5	19.8	37.0		9.5	33.3	29.3		9.4	58.4	56.1	
8.0	4.4	6.0	A	8.4	25.1	50.3		9.5	27.0	0.6		9.5	36.0	20.5		9.1	10 0.3	10.0	
9.2	7.1	16.3		9.4	25.5	19.9		9.0	31.2	18.0	A	9.3	59.9	18.7		8.7	20.1	37.3	A
9.4	8.0	57.3		9.4	28.0	32.9		9.1	31.5	21.6	A	9.5	0 2.9	3.9		8.5	24.0	56.7	A
9.1	8.4	42.9	A	9.1	34.7	29.3		9.1	44.1	47.5		6.5	10.8	31.7	A	9.5	28.5	59.0	
9.2	8.9	16.1		9.2	46.0	25.0		9.5	47.3	27.4		9.5	58.2	33.4		8.3	37.4	15.1	A
9.5	13.8	7.5		9.5	48.3	31.5		9.4	50.6	21.4		9.0	1 5.5	9.9	A	9.5	46.5	4.3	
9.5	43.2	40.3		9.2	52.2	50.8	A	9.5	53 0.0	24.0		8.5	8.5	9.7	A	9.5	58.5	47.5	
9.5	51.4	32.5		9.5	58.7	21.5		8.6	1.8	54.1		9.5	24.1	37.5		9.5	11 8.0	16.7	
9.3	34 23.3	24.1		9.5	45 19.0	12.2		9.4	4.2	47.9		9.4	30.3	20.0		9.5	9.1	9.8	
9.0	26.6	53.2	A	9.5	21.4	18.2		9.0	18.4	6.3		9.2	2 1.5	27.0	A	9.4	16.0	53.6	
9.5	37.7	0.6		9.4	23.8	49.8		8.5	19.8	17.4	A	9.4	6.2	33.0		9.0	20.2	21.3	
8.8	38.8	47.5	A	9.3	45.3	1.5		9.5	21.5	35.2		9.4	21.3	19.8		9.0	22.8	12.0	
8.5	43.5	44.7	A	9.5	51.6	57.9		9.4	22.5	25.4	B	9.5	27.8	49.0		9.2	28.7	50.9	B
7.5	35 41.2	10.2	A	9.4	53.2	28.7		9.3	37.8	54.7		9.5	38.0	4.5		9.5	45.5	58.2	
8.2	55.5	40.4	A	9.4	46 4.9	2.9		9.4	41.5	27.6		9.4	45.5	56.5		9.5	58.0	50.5	
9.5	36 5.9	37.3		6.5	26.3	45.1	A	9.5	44.1	25.2	B	8.9	47.9	47.1	A	9.2	12 6.5	55.2	
9.5	12.8	22.8		7.3	34.9	52.0	A	9.4	52.7	39.7	B	9.4	54.1	15.9	A	9.4	9.4	11.8	B
9.5	23.5	59.6		9.5	48.4	0.7		9.5	54 3.6	45.7		6.9	57.3	13.6	A	9.4	16.4	33.2	
9.5	35.6	40.2		9.2	50.2	24.3	B	9.4	8.0	38.9		9.0	3 0.9	19.7	A	8.9	18.4	34.2	B
9.0	39.6	20.0		8.8	47 15.7	20.4	A	9.4	8.5	22.6		9.3	1.6	24.8		8.5	22.0	2.1	
9.5	40.0	22.4		8.7	16.5	12.1	A	9.5	21.9	2.4		9.5	15.8	31.9		9.0	29.2	33.0	B
9.4	37 7.5	52.4		9.4	23.5	1.6		8.9	37.9	14.0	A	9.2	16.5	2.2	A	8.0	43.7	9.9	L
9.3	15.4	55.0		9.5	31.2	31.9		9.5	46.1	20.0		7.0	18.3	48.8	A	9.4	49.3	13.9	
9.5	16.0	5.8		9.5	33.3	45.4		8.9	57.4	36.3		9.4	27.7	36.7		9.1	52.0	8.2	
9.3	26.0	45.1		9.3	43.1	2.9	B	8.5	55 11.0	35.3	A	8.5	33.5	0.2	A	9.5	13 27.0	18.8	
9.0	37.1	11.3		9.5	52.5	12.9		9.5	16.0	46.6		8.5	45.9	14.8	A	9.5	45.2	40.4	
9.5	51.8	48.8		9.5	48 11.0	41.4		9.0	16.2	52.2	B	8.7	4 16.8	36.0	A	9.1	14 22.5	54.6	
8.9	55.7	32.2		9.2	14.6	6.5		8.0	24.2	29.1	L	9.5	16.8	17.2		9.4	27.4	33.0	
9.5	38 21.6	52.8		9.3	24.8	57.9		7.8	25.6	40.2	A	9.3	35.0	15.6	A	9.0	38.0	33.1	
9.4	27.3	44.6		9.0	31.8	1.7		9.4	38.0	50.7		9.0	35.8	37.8	A	8.3	39.6	7.4	A
9.5	29.2	31.5		9.0	33.2	49.0	B	9.4	40.3	56.8	B	9.5	40.0	15.1	A	9.5	40.4	47.5	
9.1	58.9	24.6		9.3	45.2	56.9		7.8	50.8	36.2	A	7.5	49.1	12.0	A	9.5	15 0.0	36.2	
9.5	39 3.1	54.2		8.8	56.9	49.0		9.5	58.8	20.8		9.4	5 11.5	4.6		7.7	14.4	30.7	B
8.9	21.5	24.6		9.5	49 4.7	17.8		9.4	56 3.6	17.4	B	6.8	20.5	58.0	L	8.7	28.8	20.0	
9.1	39.6	50.2		7.2	10.1	30.9	A	9.5	3.6	18.7		9.1	40.7	13.6	A	9.5	16 28.0	5.4	
8.8	46.5	39.1		9.2	18.7	12.0		8.7	3.7	40.0	A	8.6	44.0	1.1	A	9.5	46.1	54.0	
9.5	40 0.3	52.4		7.5	21.5	52.3	A	8.2	16.9	53.3	A	9.5	55.4	57.6		9.5	17 24.2	14.0	
8.8	54.5	22.5		9.5	29.0	1.2		9.5	18.5	12.6		9.5	6 8.5	59.9	B	9.2	30.5	40.2	
8.4	55.8	34.3		9.3	37.1	26.1		9.4	18.8	36.6		8.5	17.6	8.6	A	8.3	54.0	54.6	A
9.2	41 2.1	59.8		8.3	43.8	38.2	A	9.5	46.6	49.4		9.0	19.0	49.3		9.2	18 40.7	27.1	
9.0	5.2	38.5		9.5	53.5	12.4		9.3	48.0	31.4		9.4	21.6	32.5	B	9.1	53.5	32.6	
9.0	7.5	31.6		9.5	50 5.8	44.4		9.0	57 5.9	29.2		8.0	31.5	4.9	A	9.5	19 13.5	2.2	
8.1	8.7	57.4	B	9.4	9.6	58.9		9.5	8.6	39.7		9.4	34.5	58.0		8.9	39.0	29.6	
7.6	32.5	18.9	B	9.5	32.0	13.7		9.3	10.7	57.4		9.3	36.1	21.8		8.8	40.6	23.7	B
9.0	40.9	51.3		9.5	40.8	25.7	A	9.5	11.5	32.2		8.8	41.6	7.2	A	9.2	20 0.2	39.3	
9.5	51.5	10.5		9.2	41.4	13.8		9.5	11.5	59.9		9.4	7 3.9	26.6		9.5	8.0	2.7	
8.5	53.4	39.7		9.4	49.3	51.6		9.4	29.5	3.8		9.4	6.5	35.5		9.5	15.4	37.5	
9.1	54.2	4.6		9.5	51 5.4	2.0		8.8	42.3	47.8	A	9.5	20.9	20.0		9.5	23.0	41.4	
9.5	42 14.5	18.5		9.0	29.0	41.8		8.0	49.0	59.2	A	9.5	27.2	37.2		9.5	46.7	10.5	
9.5	49.0	10.3	B	6.5	30.6	59.0	A	8.5	58 8.0	2.8	A	9.4	28.5	29.0		9.5	48.8	22.0	
9.5	50.0	54.8		9.5	37.3	53.9		9.5	14.8	31.6		9.4	28.7	46.6		9.5	59.0	25.0	
9.1	43 12.1	50.0	A	9.4	39.5	55.2	B	9.3	25.5	57.4		9.5	34.0	59.0		9.0	21 26.9	4.9	A

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	22u	+47°			22u	+47°			22u	+47°			22u—23u	+47°			23u	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	21 27.8	5.2	A	9.0	31 46.7	1.4	A	9.5	41 19.0	42.5		9.2	50 25.5	24.7		9.5	0 51.0	2.0	
9.2	28.9	8.8		9.1	58.5	21.9	B	9.2	24.0	48.9		7.5	26.6	13.3	A	9.4	57.4	54.2	
9.2	42.4	2.7		8.3	32 1.2	29.8	A	9.5	25.9	50.6		9.5	32.7	56.6	B	9.5	1 22.1	58.9	
9.5	53.8	16.1		9.5	2.2	15.0		7.7	30.5	2.9	B	9.5	33.0	0.4		8.4	25.9	11.4	
9.1	22 8.0	18.3		9.5	3.6	16.0		9.3	33.9	35.4		5.3	40.2	54.3	B	9.4	39.2	53.0	
9.5	9.5	20.2		9.4	32.3	23.3		9.1	42 23.3	59.5		9.5	49.7	23.7		9.1	40.3	48.8	
9.5	21.6	40.6		9.0	38.7	9.6		8.5	25.0	52.8	B	9.4	58.9	37.0		7.5	55.8	5.4	A
9.0	25.3	38.0		9.4	39.2	52.7		9.5	31.9	1.4		9.1	51 5.0	52.0		8.8	57.6	25.1	
7.7	31.0	48.6	A	9.5	45.0	55.0		8.1	37.1	38.7	B	8.5	9.3	11.4	A	9.4	2 4.9	43.3	
9.4	35.9	54.6		9.4	52.6	40.2		9.3	47.3	50.1		8.1	17.5	20.8	A	7.3	6.7	59.6	A
8.0	39.4	30.6	B	9.5	33 8.7	33.4		8.1	59.3	9.9	B	8.2	20.7	1.4	A	9.0	10.0	21.1	
9.5	51.5	38.3		9.5	12.0	51.6		9.2	43 5.0	49.2		9.5	27.3	36.0		8.8	10.7	14.9	
9.5	23 12.2	3.9		9.3	24.1	44.4		9.0	34.1	48.0	A	9.0	30.3	39.7		9.1	15.3	50.2	
8.6	31.8	1.6	A	9.1	34.8	28.6		8.9	35.5	34.0		9.3	46.9	51.7		7.5	20.7	55.0	A
8.8	57.2	4.1	A	9.4	41.4	21.2		9.4	38.6	45.2	B	9.5	49.4	28.6		9.5	46.4	43.5	
9.5	24 0.1	5.0		9.0	46.0	45.4		8.7	48.2	46.3	A	9.0	52 10.0	34.2		8.1	3 7.0	51.9	A
9.5	18.4	17.0		9.3	46.3	58.7		9.4	52.7	53.0		9.0	11.5	58.6		8.4	18.1	46.1	
9.1	20.6	51.8		9.2	50.0	14.9		8.1	44 5.6	34.9	A	8.7	13.1	29.2	A	8.5	18.2	10.2	L
9.0	33.5	42.5		9.4	57.3	52.8		9.2	12.5	15.0		9.2	36.8	14.7		7.5	20.0	10.2	S
8.9	39.5	49.8		9.5	34 1.6	43.2		8.5	28.3	27.0	A	9.4	56.4	2.0		8.9	27.5	21.4	
8.9	49.0	24.4		9.0	18.1	47.9	A	8.5	31.6	11.5	A	9.3	56.7	29.5		9.5	41.4	36.7	
8.5	54.8	40.7		9.1	38.9	24.0		9.5	41.8	23.2		9.1	53 26.5	9.6		9.5	53.1	10.4	
9.0	25 0.0	52.8		9.2	41.0	35.5		8.4	45.9	51.7	A	9.3	31.4	47.0		9.5	4 11.0	17.7	
9.3	12.5	57.7		8.8	42.0	40.2		7.0	54.6	57.9	A	9.4	36.7	6.7		9.5	11.5	49.1	
9.0	20.0	8.2		9.0	35 8.5	42.0		9.4	58.8	26.9		8.8	50.8	20.7	A	9.4	46.1	6.5	
9.1	21.7	20.3		9.2	30.1	23.9		8.9	45 3.5	37.0	A	8.3	51.5	35.4	A	9.5	47.2	8.1	
9.5	30.0	51.2		9.4	34.3	5.4		9.3	7.2	31.9		8.5	55.6	8.6	A	9.5	5 10.9	42.6	
9.0	39.6	15.4		9.2	41.4	22.9		9.3	16.3	44.4		9.4	58.5	9.3	A	9.5	30.0	50.6	
9.4	45.5	29.2		9.0	41.8	29.0		9.1	25.4	18.4		8.5	59.7	38.2	A	9.4	31.1	11.0	
9.2	54.0	38.4	A	9.2	55.5	44.4		9.2	25.9	38.3		8.7	54 22.7	4.1	A	9.5	32.9	46.9	B
9.5	58.7	58.4		9.4	36 21.3	3.4		9.5	49.0	41.8		9.5	32.5	54.3		9.4	42.8	25.1	
9.5	26 6.5	46.7		8.7	35.1	44.5		9.3	58.0	43.5		8.1	37.0	22.1	B	9.5	50.0	27.4	
9.5	8.2	56.8		8.7	42.5	16.8		9.5	58.7	13.3		9.5	49.7	33.4		9.2	52.3	28.4	B
9.4	24.5	8.1	B	9.3	52.7	4.4		9.5	46 7.0	14.3		9.5	58.9	22.5		9.4	6 4.4	22.2	
9.5	30.3	37.5		9.3	57.1	40.5		9.5	7.1	13.0		7.0	55 24.0	10.4	A	9.0	12.7	29.8	
9.2	42.6	54.3	B	9.9	37 1.0	54.1		9.5	10.6	40.0		9.4	26.3	2.0		9.0	13.5	2.2	
9.3	43.2	22.9		8.8	17.9	29.6		9.4	17.5	46.9		7.5	27.9	13.2	A	9.3	30.9	39.9	
8.5	52.2	30.8	A	9.4	20.5	0.0		9.0	22.0	41.5		8.8	43.0	14.0	A	9.2	31.4	35.7	B
9.5	59.7	6.2		9.5	38.2	1.2		9.3	27.4	59.7		9.4	44.5	32.0		9.4	34.1	20.5	
9.2	27 8.2	5.4		9.5	48.3	33.5		9.5	29.1	12.5		9.2	47.7	5.4	A	9.5	7 0.0	2.4	
8.5	32.3	12.5	A	9.4	53.4	50.8		9.0	47 6.5	51.4		9.4	56 2.0	0.3		9.5	5.9	26.5	
9.5	36.3	59.2		9.0	38 19.6	13.3	A	8.0	26.6	48.4	A	9.2	7.1	29.9		9.4	8.4	48.9	
9.5	42.9	22.0		9.5	24.8	26.5		9.4	55.9	51.6		9.4	12.9	20.0		9.3	10.0	16.5	B
9.5	58.0	23.5		9.0	35.9	30.8		9.5	58.2	58.8		9.2	28.6	59.2		8.8	17.8	35.5	B
9.5	28 7.7	44.3		9.5	38.0	49.1		8.8	48 25.0	16.1		9.1	53.0	30.0		9.5	20.0	41.0	
9.3	17.2	27.8		9.0	48.5	39.2		8.8	25.8	3.3	B	9.2	57 30.6	55.6		9.0	27.0	5.9	
9.1	25.6	29.9	B	8.5	50.3	17.0		9.1	32.5	9.0		8.5	31.9	48.6	A	8.7	40.2	36.4	B
9.4	30.5	41.4		9.5	39 3.5	53.1		9.0	39.3	44.3		8.7	37.3	51.4		8.7	8 30.3	25.7	A
9.3	34.4	29.2		9.2	12.3	33.6		9.5	40.9	56.3		9.0	58 16.4	18.0		9.5	34.2	6.5	
9.4	57.8	0.4		7.8	18.3	24.1	A	9.5	43.9	52.6		9.3	34.9	49.4		9.5	9 26.4	13.7	
8.8	29 49.9	28.0	A	9.5	30.6	30.5		9.5	47.0	50.6		9.5	45.1	32.0		9.5	27.5	40.8	
9.5	56.0	49.9		9.2	43.0	39.3		9.4	52.2	27.3		9.4	50.9	21.1		9.4	55.2	24.1	
9.5	30 8.0	11.5		8.8	44.6	32.1		9.5	49 4.5	50.6		9.5	59 30.8	27.9		9.0	56.4	14.1	
9.5	16.4	25.1		9.2	49.6	24.0		9.4	35.8	44.1		9.5	31.5	52.9		9.1	10 7.8	25.7	
9.5	23.1	10.5		9.0	50.3	43.1		9.4	41.5	58.1		9.5	42.4	55.0		9.4	13.0	43.7	
8.1	39.5	7.7	A	9.4	40 21.0	2.1		9.5	41.8	20.1		8.5	47.1	58.4	A	9.4	17.1	50.4	
9.0	40.5	12.7		8.8	34.0	32.6	A	8.9	50 1.3	1.0		8.8	48.7	10.9		9.5	25.0	45.9	
9.5	41.6	40.0	B	9.4	48.0	56.5		8.8	5.9	27.3		8.2	0 27.0	57.8	A	9.4	46.6	42.9	
9.5	42.2	18.0		9.4	48.0	50.5	B	7.8	13.8	20.0	A	9.0	37.6	13.1		9.2	51.4	53.5	
9.5	31 29.9	51.9		9.5	41 13.8	19.0		9.1	19.0	52.1		9.5	42.7	11.5		8.8	53.8	31.4	A

4101—4157				4158—4214				4215—4271				4272—4327				4328—4383			
	23h	+47°			23h	+47°			23h	+47°			23h	+47°			23h	+47°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.4	11 9.7	4.0		9.2	19 50.7	46.5	A	9.5	30 25.9	29.6		9.5	38 39.1	6.8		9.5	49 23.4	3.5	
8.9	11.0	40.3		9.2	53.2	32.1	B	8.3	27.7	44.4	A	9.4	39 2.5	38.2		8.7	53.6	17.8	A
9.0	16.3	56.1		8.0	54.6	44.8	A	8.9	30.8	52.7		9.4	5.0	40.9		9.4	50 0.1	53.5	
9.4	18.4	59.0		9.5	57.7	31.3		9.5	44.3	38.9		9.5	8.3	21.6		7.4	2.2	28.2	A
9.5	31.9	33.4		8.6	20 15.4	9.6	A	9.5	45.2	50.5		9.5	12.7	36.2		9.4	5.3	54.4	
9.5	45.7	47.9		9.3	43.2	15.5	B	9.0	49.0	41.6	A	9.5	30.5	17.2		9.5	8.4	40.9	
7.5	12 12.0	42.4	A	9.5	48.3	59.2		9.2	52.3	49.4	B	9.5	31.0	22.5		9.0	9.7	28.4	A
8.6	15.7	10.3		9.5	21 6.7	47.0		9.4	31 7.4	25.1	B	9.4	32.6	47.5		8.4	13.3	15.9	A
8.9	17.5	22.3	B	9.3	11.4	38.0		9.5	8.1	15.5		7.3	44.3	59.8	B	8.7	15.8	13.2	
6.0	44.7	50.0	A	9.3	19.0	58.4		9.0	10.8	55.4		9.5	56.3	14.6		8.5	17.7	36.9	
9.3	46.0	36.0		9.3	31.2	25.1		9.5	18.3	37.8		9.4	40 20.1	38.7		8.5	18.4	35.4	
9.5	47.9	48.6		7.7	39.9	50.8	A	9.5	25.6	26.1		8.8	47.9	2.0	A	9.0	27.0	4.8	
9.5	52.0	55.8		9.5	40.4	1.3		9.5	44.0	43.4		9.5	51.3	56.0		9.2	27.9	55.1	
6.5	53.9	35.5	A	9.4	51.5	47.7		9.5	47.0	43.7		9.5	53.0	19.5		9.5	30.2	11.8	
9.2	56.5	52.5		9.5	51.5	52.3		8.5	49.2	15.8		9.5	41 10.8	28.0		9.5	38.0	41.6	
9.5	13 17.4	42.2	B	9.5	57.5	23.1		9.5	50.4	8.5		9.0	19.2	40.2		8.6	51 4.9	58.4	
9.5	26.3	28.3		9.5	22 34.8	46.4		9.5	32 10.2	26.1		8.5	31.3	45.8	L	9.4	6.5	27.2	
9.5	33.7	18.2		9.2	37.2	41.8		9.5	39.1	19.2		9.0	42.4	59.6		9.5	8.1	5.6	
9.5	36.0	31.3		9.2	39.4	9.4		9.1	45.4	55.2		9.2	50.1	45.1		9.5	19.3	14.1	
9.5	36.7	18.7		7.5	42.3	34.7	A	8.5	49.2	57.4		9.5	50.6	50.2		9.0	23.2	17.7	A
9.2	45.2	59.7		9.1	53.0	1.4		8.8	33 11.8	44.9	A	8.5	42 0.0	38.1	L	9.5	26.8	45.4	
9.0	55.9	58.5		9.0	54.4	4.0		9.5	30.8	6.9		9.1	7.0	21.3		8.5	27.2	22.0	A
9.5	56.0	41.0		8.7	59.1	22.0	A	9.2	36.4	2.6		9.5	19.9	16.6		9.3	28.7	35.9	
9.0	58.7	59.9		8.9	23 35.4	28.3	A	9.5	40.5	14.5		9.5	38.3	44.0		9.5	47.5	38.2	
9.4	14 5.6	27.5		9.5	57.6	35.0		9.4	49.1	42.3		9.4	38.8	44.9	B	9.5	52 23.1	6.5	
9.2	7.6	19.2	B	9.5	24 9.7	50.6		8.5	34 0.0	59.3		9.3	47.4	11.0		9.3	40.7	42.9	
9.4	27.0	2.2		9.4	53.5	1.1		9.5	29.4	25.4		9.4	48.0	6.7		9.5	53 2.8	54.0	
9.5	37.6	24.1		9.4	25 12.5	53.7		8.0	35.0	36.0	A	9.4	43 6.0	2.7		9.5	3.0	0.1	
9.5	38.2	44.2		8.0	35.7	34.1	A	9.0	47.9	33.0		8.7	48.3	39.0		9.2	33.0	58.9	
8.7	39.3	9.1		9.5	39.4	41.5		8.9	48.7	3.5		8.7	44 0.7	58.5		9.5	33.5	20.1	
9.5	43.8	0.3		8.9	40.0	58.2	A	9.0	35 12.7	21.7		9.0	7.5	6.7		9.5	35.5	18.0	
8.5	15 29.8	25.0		8.9	26 2.5	10.8		8.9	16.9	27.8		9.2	25.9	45.5		9.2	56.6	40.3	
9.5	31.4	0.9	B	9.2	14.0	28.1		9.5	26.1	45.2		9.5	27.0	27.1		9.5	56.8	2.7	
9.2	37.1	51.5	A	9.2	18.4	47.6		9.5	36 7.5	53.3		9.5	50.5	0.4		8.5	54 1.3	7.9	A
9.5	43.9	46.8		8.5	51.2	53.1	A	9.5	13.0	29.5		9.5	45 2.9	40.6		9.5	19.4	53.1	
9.5	16 25.3	14.5		9.1	27 26.5	46.0		9.5	13.0	32.5		9.5	9.2	24.7		9.0	39.3	9.7	A
9.5	42.6	3.8		9.1	34.6	3.4		9.5	24.0	11.2		7.5	34.8	40.7	L	9.5	55 19.3	37.1	
8.5	57.5	49.0	A	9.2	35.3	24.5		9.5	30.0	11.5		9.5	59.7	56.0		8.4	20.9	21.3	A
9.4	17 4.4	21.9		9.5	57.4	36.5		9.5	42.2	37.7		9.5	46 20.9	17.2		9.4	22.8	45.0	
8.0	9.3	39.0	A	9.3	28 0.9	46.1		9.1	49.3	34.4		8.4	27.3	49.4	A	8.4	23.7	16.1	A
9.5	23.5	57.8		9.2	2.4	10.5		9.2	50.0	6.3		7.5	47 8.9	49.6	A	9.1	24.5	5.4	
9.5	25.7	26.5		9.5	37.5	31.8		8.9	53.4	12.5		9.0	14.5	26.9		9.3	26.9	6.7	
9.5	28.5	12.8		9.2	39.1	26.7		9.4	37 5.3	3.2		9.2	15.1	21.2		9.5	40.8	34.6	
9.1	28.6	6.5	B	9.0	43.0	28.1	A	9.5	17.4	32.0		9.5	19.9	9.4		7.7	48.4	54.9	B
8.7	32.8	38.8	A	9.5	49.6	21.8		9.0	25.1	0.8	B	9.5	30.6	46.4		9.5	56 3.1	30.2	
9.4	34.7	0.7		9.5	52.7	49.4		9.5	29.3	43.6		9.4	51.3	46.1		6.4	17.4	37.9	A
9.5	39.3	8.0		9.5	57.9	48.8		9.4	35.0	15.0		8.4	48 4.3	49.5	A	9.2	57 27.6	58.4	B
9.5	18 11.0	18.1		9.5	29 0.3	23.8		9.0	38.9	49.0		9.0	5.0	7.4		9.4	36.1	37.5	
9.4	26.6	12.5		8.9	39.6	26.6	A	9.4	43.5	6.6		9.3	9.0	46.8		9.2	50.0	58.3	
8.2	42.3	2.7	A	9.5	43.0	51.8		8.4	45.8	41.8	A	9.4	17.1	53.0		8.0	51.0	40.1	A
9.5	49.5	49.0		8.9	48.2	3.7	A	8.8	51.2	18.4	A	6.5	29.3	25.2	A	9.5	58 27.2	30.3	
9.1	52.4	28.2		8.5	50.8	23.7	A	9.5	59.0	2.8		9.2	32.8	12.0		9.5	34.7	19.0	
9.5	56.3	12.9		9.4	54.7	36.5		9.5	38 12.1	50.5		9.0	49 4.4	54.0		9.4	41.3	29.4	
9.2	19 16.0	26.3		8.3	30 0.0	46.4	A	9.5	23.8	32.8		9.5	11.0	2.8		8.9	59 6.6	31.9	A
9.5	19.4	39.4		9.5	5.8	53.2		9.1	33.0	38.6		8.6	12.8	8.3		9.5	32.9	31.6	
9.5	23.7	19.1		8.8	8.8	52.0		9.2	33.3	41.5		8.9	17.5	38.8		9.5	50.3	13.8	
9.5	39.0	3.9		8.3	16.2	40.8	A	9.4	36.7	28.8									

Zone +48°

1—40				41—80				81—120				121—160				161—200			
	0h	+48°			0h	+48°			0h	+48°			0h	+48°			0h	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	0 0.1	53.1		8.5	6 8.4	45.2	A	9.5	12 44.7	32.1		8.0	18 3.2	51.2	A	9.5	24 54.9	23.6	
9.1	11.4	50.8		8.5	9.2	45.0	A	9.3	45.0	3.6		9.5	8.6	59.5		9.2	56.0	31.5	
9.3	16.3	0.6		9.5	11.6	40.4		8.3	49.0	22.9	L	9.5	13.6	57.5	B	9.4	25 5.1	1.4	
9.5	24.2	59.0		9.1	26.3	30.6		6.6	49.0	10.8	A	8.2	20.9	39.8	A	9.0	20.1	17.9	
9.0	27.3	54.7		9.5	28.0	41.3		9.3	49.5	26.1		7.9	25.0	34.7	A	9.5	20.7	49.1	
9.4	34.7	43.3		9.5	48.3	18.2		9.5	13 6.5	26.8		7.3	34.9	14.5	L	9.5	26.2	5.6	
9.3	50.6	33.4		9.5	59.8	36.7		9.3	23.1	56.6		9.5	19 2.0	35.9		9.5	26 16.1	7.8	
9.5	1 1.8	43.9		9.5	7 1.0	7.4		8.7	29.9	1.5	A	9.4	3.8	22.0		8.9	27.4	31.2	A
9.1	2.1	12.9		9.4	28.9	34.7		9.5	48.0	5.9		9.1	4.6	5.9		9.0	33.3	31.0	A
9.2	16.4	16.1		8.5	36.8	53.8		8.6	54.0	7.2	A	9.5	8.8	5.2		9.3	35.0	56.5	
8.8	24.8	55.4		9.3	46.7	40.2		9.5	14 7.2	55.3		9.5	19.7	33.0		9.4	43.0	6.8	
9.2	35.0	58.5		9.2	8 4.3	29.8		9.5	11.9	20.6		9.5	41.0	1.1		9.5	27 3.7	2.3	
9.5	40.0	58.5		8.0	8.9	31.4	B	9.5	17.2	3.3		9.5	49.6	2.9		9.5	14.2	13.8	
9.5	43.0	32.5		9.5	14.4	24.6		9.5	31.2	21.5		9.2	49.7	24.0		9.5	29.1	44.2	
9.3	2 5.4	23.9		8.7	17.8	28.2		9.0	31.3	58.2		8.9	20 15.8	22.0		8.9	46.7	56.3	
9.5	20.1	55.1		9.5	55.2	19.1		8.9	15 1.5	1.1	A	9.0	24.6	38.7		9.5	49.4	40.0	
8.4	21.4	11.2		9.5	58.3	4.4		9.4	12.2	57.2		9.0	27.4	59.1	A	6.7	53.4	13.5	A
9.5	26.0	46.0		9.5	58.8	6.5		9.5	15.3	10.1		9.5	42.9	52.1		8.5	28 17.2	56.9	
8.2	27.7	49.4	B	9.0	9 8.9	4.9		9.1	22.4	27.3		9.5	44.4	43.0		9.4	23.6	21.4	
9.0	38.1	15.1		6.5	16.5	39.5	L	8.8	39.6	58.2		9.3	21 0.8	14.1		9.5	40.1	23.8	
9.4	41.9	49.9		9.5	26.2	16.3		9.3	39.8	43.5		9.0	1.0	25.8		9.5	44.3	36.1	
9.2	45.2	31.6		9.2	34.9	42.3		9.4	47.0	58.2		9.2	40.9	37.5		8.0	46.7	1.6	A
8.7	3 1.9	37.0	B	9.1	46.8	46.7		9.5	59.0	0.5		9.4	43.8	54.0		8.2	48.6	9.3	A
9.2	8.8	32.8		9.5	10 0.2	37.9		9.5	16 5.1	31.3		9.4	45.4	7.7		9.0	29 15.9	30.7	
7.2	14.5	12.6		9.0	17.8	53.8		9.5	6.3	5.7		9.5	55.1	45.8		9.1	48.9	26.2	
9.4	14.6	28.3		9.2	28.0	48.6		8.2	13.0	23.9	A	9.0	57.8	26.9	A	9.4	58.0	8.3	
9.5	28.3	19.6		7.7	42.8	41.7	L	9.5	20.9	15.4		9.3	22 4.6	59.4		9.1	58.6	35.9	A
8.0	30.3	45.5	A	9.5	56.0	43.6		9.4	27.0	50.7		9.5	7.2	44.5		9.5	30 9.6	38.5	
9.4	32.2	37.8		9.4	11 18.1	25.8		9.5	35.3	0.3		9.5	31.8	6.4		8.9	31.9	45.4	
7.2	36.8	44.6	A	9.5	28.5	20.2		9.5	38.5	6.0		9.5	39.0	57.2		9.3	31 3.1	26.5	
9.5	38.5	11.0		8.5	30.4	57.2		9.5	52.0	16.9		9.5	46.1	28.8		9.2	10.0	20.7	
9.5	47.2	38.2		8.5	34.8	7.4	R	8.2	53.1	42.9	A	9.5	23 2.0	28.7		6.0	10.4	33.4	A
9.5	4 17.1	20.8		9.2	47.7	30.6		9.5	17 2.0	31.6		9.0	37.6	15.9		9.0	27.2	42.2	
9.3	28.7	9.8		9.4	49.9	10.8		9.3	3.4	49.1		9.5	49.5	40.4		9.5	32.6	59.0	
9.1	43.6	8.2		9.2	53.0	31.3		8.7	7.0	1.5		9.5	57.4	40.1		8.0	34.1	46.3	A
9.3	59.3	34.5	A	9.5	12 7.8	10.6		9.0	9.5	42.9		9.5	59.4	21.3		9.5	35.3	6.6	
9.4	5 3.8	0.8		9.5	19.5	0.7		8.4	19.9	16.4		9.5	24 5.6	4.9		9.5	36.4	3.8	
8.8	6.0	18.8	A	9.5	22.3	18.2		9.5	41.0	51.0		9.4	9.5	30.6		9.3	40.5	49.8	A
9.4	31.8	5.9		6.4	25.0	3.4	A	9.0	45.1	40.7	A	8.7	16.0	59.0		9.5	46.7	1.3	
7.0	45.0	55.3	A	8.2	32.0	57.7	B	9.3	18 2.0	56.2		9.5	21.3	50.7		9.5	51.0	29.1	

201—260				261—320				321—380				381—440				441—500			
	0ᵐ		+48°		0ᵐ		+48°		0ᵐ—1ᵐ		+48°		1ᵐ		+48°		1ᵐ		+48°
m	′	″	′		m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
8.8	31	56.2	33.0	A	9.5	44	23.8	40.0	9.0	53	39.7	12.8	9.3	7	9.2	57.1	9.5	19	18.0	26.5
9.5	32	15.4	24.8		9.5		28.1	38.2	7.8		45.8	41.3	A	9.1		27.4	6.1	9.5		20.9	56.3
9.4		23.9	23.7		9.0		33.6	19.5	9.5	54	6.8	7.4		9.0		36.7	51.7	9.4		21.0	18.6
9.5		47.5	31.2		9.3		33.7	28.8	9.5		13.8	13.9		9.3		42.0	27.2	9.5		41.0	6.5
9.5		52.0	7.2		9.5		34.5	49.8	9.4	55	13.5	36.9		9.3		49.2	30.5	B	9.5		59.5	29.5
9.4	33	10.4	40.7		8.8		40.7	55.3	A	9.5		14.6	41.0		9.3		58.1	19.6	8.9	20	3.6	58.3	A
9.5		12.0	17.0		8.5		46.1	39.3	B	7.0		33.9	5.0	B	9.5	8	30.9	27.1	9.5		40.4	58.9	
9.1		44.4	54.3		9.5		47.1	47.6		7.2		34.8	56.9	A	9.2		38.8	8.7	8.3		41.9	25.0	
8.7		52.7	49.3	A	9.5		48.7	35.4		7.8	56	2.0	25.6	B	9.5		57.7	13.0	9.5		55.4	34.9	
9.4	34	19.5	32.6		9.5		54.7	29.8		8.0		6.4	50.9	A	9.2	9	6.9	5.7	9.5	21	7.6	54.7	B
9.5		31.9	7.1		9.5	45	1.1	44.3		9.5		23.9	16.5		8.0		8.4	59.3	A	9.5		22.2	32.7	
9.0		35.8	47.0	A	7.8		5.1	52.2	A	9.2		33.7	53.2		6.9		13.2	14.9	A	9.4	22	1.6	55.5	
9.0		42.5	34.2	A	9.3		5.3	41.6		9.0	57	13.2	31.5		9.4		14.3	16.1		6.9		13.0	35.7	A
9.5	35	15.8	51.3		9.5		14.0	46.9		9.4		33.0	23.6		9.2		15.3	24.8		8.8		43.7	17.3	A
8.5		20.0	48.0	A	9.4		24.7	44.1		9.5		40.9	23.0		8.5		29.8	59.9	A	8.9		43.9	2.3	B
9.5		32.2	33.4		9.5		26.6	48.6		8.7		50.7	17.6		8.5		30.2	20.0	B	9.5		49.4	41.9	
9.4		38.0	7.9		9.5		30.0	58.0		6.7	58	48.0	46.9	A	8.5		37.4	44.8	A	9.5	23	19.8	28.2	
9.3		52.3	23.2		9.5		31.4	0.6		9.5		55.4	15.1		9.5	10	8.5	23.0		9.5		41.4	46.3	
6.9		55.6	16.5	B	9.5		40.7	47.5		9.5	59	12.5	23.2		9.5		13.2	47.5		9.1		57.6	45.8	
9.2	36	0.7	16.3	B	8.8		43.5	3.4	A	9.1		12.5	24.0		8.8		16.0	42.5	A	9.5	24	16.3	12.8	
9.5		14.0	53.3		9.5		43.6	9.0		9.1		12.5	15.3		8.8		16.5	49.3	A	9.1		22.0	25.5	
9.3		16.0	48.7	A	9.5		56.0	53.0		9.5		16.0	23.3		9.5		26.8	35.6		9.4		22.9	31.4	
9.5		46.9	36.9		9.5	46	4.8	37.6		9.1		48.9	28.2		9.5		43.5	29.6		8.3		33.6	15.8	A
9.5		49.1	36.5		9.5		9.4	20.6		9.5	0	20.0	39.0		8.8		45.4	12.1		9.4		35.0	55.1	
9.5	37	16.6	8.8		9.3		19.3	48.2		9.4		21.4	13.7		9.2		50.5	55.4		9.2		36.1	52.0	
9.4		24.0	40.9		9.5		24.0	41.5		9.5	1	7.5	41.4		9.5	11	20.0	39.4		9.4		40.6	50.2	
9.5		43.9	14.7		9.2		36.7	48.3		8.4		17.7	36.8		9.5		52.7	59.3		8.5		46.8	44.9	A
9.5		55.4	1.6		7.1		40.1	36.8	A	6.9		24.1	16.7	A	9.0	12	38.0	52.5		8.9	25	6.6	56.9	A
9.4		58.5	50.0		9.4		58.4	52.0		9.1		37.5	4.1		8.8		39.3	59.5	A	9.5		19.1	34.9	
9.3	38	15.4	58.4		9.2	48	23.1	38.6		9.2		46.8	29.9		9.5	14	6.4	27.6		7.3		38.4	49.0	A
8.8		16.8	53.4	A	9.0		32.9	36.9		9.5		59.8	12.9		9.1		8.9	33.3		9.5	26	12.9	28.5	
9.0		22.1	11.5		9.5		47.8	18.9		8.4	2	5.8	30.3	A	9.4		21.3	14.8		9.5		46.5	16.8	
9.5		34.4	1.3		9.2		48.3	8.0		8.8		10.7	14.2		8.9		32.7	47.0		8.8		56.4	1.0	A
9.5		40.5	43.1		9.5		54.8	47.8		9.4		21.6	20.8		9.1		34.3	19.6	B	9.5		59.0	22.0	
9.5	39	5.4	7.8		9.5	49	28.0	42.7		7.3		23.7	23.2	A	9.5		50.0	56.1		9.4	27	6.0	22.2	
7.8		19.6	51.7	A	9.5		33.9	34.8		9.2	3	0.4	16.5		9.2		52.4	44.2		9.2		6.4	57.2	
9.2		40.4	35.3		9.5		47.0	8.2		7.6		9.6	51.7	A	8.8	15	0.0	30.1	A	8.5		18.9	27.8	
8.7	40	2.0	9.2		9.2		58.5	24.8		9.5		11.3	6.0		9.5		32.9	5.1		9.4		28.8	39.9	
9.2		8.3	9.3		9.5		58.5	45.0		9.5		19.4	38.3		9.3		38.1	20.2		9.5		33.7	11.1	
9.0		12.4	58.5		8.8	50	0.8	58.7		8.7		43.0	22.7		9.5		47.5	27.5		9.5		50.3	25.3	
7.4		16.5	55.4	A	7.2		24.9	23.7	B	8.6		44.2	50.0		9.2		53.8	37.2		9.1		54.2	59.0	
9.4		36.8	59.9		7.9		28.5	8.9		9.4		50.8	12.9		8.4		57.8	1.0	A	7.2	28	14.7	20.3	A
9.5		38.0	13.9		9.5		36.8	55.9		9.4		59.6	4.1		9.5	16	11.9	25.1		9.5		18.3	5.8	
9.1		57.1	10.9		9.5		46.8	26.6		9.5	4	45.4	26.4		9.5		19.8	13.3	B	9.1		22.0	22.4	
8.8	41	4.9	12.0		9.5		55.2	51.5		7.5		49.2	30.2	L	9.5		22.0	13.8		9.5		23.3	4.4	
9.5		11.4	2.8		9.5	51	8.7	36.3		9.5		50.0	19.5		8.0	17	12.9	28.5	A	9.0	29	5.7	20.2	A
9.2		44.9	21.2		9.5		9.0	39.8		9.4		50.4	47.1		9.5		15.5	54.6		9.5		7.1	46.5	
8.7		58.8	32.2		9.5		12.9	44.2		9.5	5	8.6	7.2		9.4		30.3	57.3		9.0		11.9	41.4	
7.3	42	2.8	36.1	L	6.5		13.9	11.0	B	7.5		17.8	1.0	G	9.0		45.6	8.8		8.5		15.4	28.7	A
8.2		23.2	6.0	B	9.2		14.2	26.8		8.5		23.7	28.1		8.5		50.0	52.9		9.1		28.7	33.2	
9.5		25.0	46.9		9.0		32.6	48.4		9.5		31.1	1.1		9.3	18	3.7	22.9	B	9.5		34.6	25.6	
9.5		36.9	14.0		8.5		55.9	21.2		9.4		49.4	3.9		9.5		14.2	37.6		9.4		36.5	36.8	
9.5		55.5	53.3		8.5	52	6.8	41.1		9.5	6	0.9	5.4		9.4		18.0	57.1		8.9		49.3	10.1	
9.5		55.5	17.6		9.5		38.4	42.0		7.0		2.2	39.9	L	9.4		26.3	27.2		9.3		53.8	27.3	A
9.5	43	3.1	3.8		8.8		51.2	59.3	A	9.2		3.8	47.3		8.0		36.7	47.4		9.5	30	20.5	15.8	
9.1		21.6	46.8		9.3		53.8	5.9		9.4		9.6	6.6		8.4		46.6	29.3		9.1		24.3	52.5	A
7.5		39.3	11.6	L	8.7		55.6	23.4		9.5		33.1	57.0		9.5		57.0	33.4		9.4		45.8	15.8	
9.2		47.2	6.2		9.5		56.9	31.5		9.3		38.7	59.5		9.5		59.1	8.7		9.4		49.3	27.9	
8.7		50.0	6.6		9.3	53	6.0	13.5		9.2		41.8	18.9		8.7	19	1.5	45.5		9.5	31	6.5	3.9	
9.5	44	15.7	57.5		6.2		7.0	45.7	A	9.3	7	4.0	56.8		9.4		12.9	15.4		9.5		21.7	46.9	

Zone +48°

1—40				41—80				81—120				121—160				161—200			
	0h	+48°			0h	+48°			0h	+48°			0h	+48°			0h	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	0 0.1	53.1		8.5	6 8.4	45.2	A	9.5	12 44.7	32.1		8.0	18 3.2	51.2	A	9.5	24 54.9	23.6	
9.1	11.4	50.8		8.5	9.2	45.0	A	9.3	45.0	3.6		9.5	8.6	59.5		9.2	56.0	31.5	
9.3	16.3	0.6		9.5	11.6	40.4		8.3	49.0	22.9	L	9.5	13.6	57.5	B	9.4	25 5.1	1.4	
9.5	24.2	59.0		9.1	26.3	30.6		6.6	49.0	10.8	A	8.2	20.9	39.8	A	9.0	20.1	17.9	
9.0	27.3	54.7		9.5	28.0	41.3		9.3	49.5	26.1		7.9	25.0	34.7	A	9.5	20.7	49.1	
9.4	34.7	43.3		9.5	48.3	18.2		9.5	13 6.5	26.8		7.3	34.9	14.5	L	9.5	26.2	5.6	
9.3	50.6	33.4		9.5	59.8	36.7		9.3	23.1	56.6		9.5	19 2.0	35.9		9.5	26 16.1	7.8	
9.5	1 1.8	43.9		9.5	7 1.0	7.4		8.7	29.9	1.5	A	9.4	3.8	22.0		8.9	27.4	31.2	A
9.1	2.1	12.9		9.4	28.9	34.7		9.5	48.0	5.9		9.1	4.6	5.9		9.0	33.3	31.0	A
9.2	16.4	16.1		8.5	36.8	53.8		8.6	54.0	7.2	A	9.5	8.8	5.2		9.3	35.0	56.5	
8.8	24.8	55.4		9.3	46.7	40.2		9.5	14 7.2	55.3		9.5	19.7	33.0		9.4	43.0	6.8	
9.2	35.0	58.5		9.2	8 4.3	29.8		9.5	11.9	20.6		9.5	41.0	1.1		9.5	27 3.7	2.3	
9.5	40.0	58.5		8.0	8.9	31.4	B	9.5	17.2	3.3		9.5	49.6	2.9		9.5	14.2	13.8	
9.5	43.0	32.5		9.5	14.4	24.6		9.5	31.2	21.5		9.2	49.7	24.0		9.5	29.1	44.2	
9.3	2 5.4	23.9		8.7	17.8	28.2		9.0	31.3	58.2		8.9	20 15.8	22.0		8.9	46.7	56.3	
9.5	20.1	55.1		9.5	55.2	19.1		8.9	15 1.5	1.1	A	9.0	24.6	38.7		9.5	49.4	40.0	
8.4	21.4	11.2		9.5	58.3	4.4		9.4	12.2	57.2		9.0	27.4	59.1	A	6.7	53.4	13.5	A
9.5	26.0	46.0		9.5	58.8	6.5		9.5	15.3	10.1		9.5	42.9	52.1		8.5	28 17.2	56.9	
8.2	27.7	49.4	B	9.0	9 8.9	4.9		9.1	22.4	27.3		9.5	44.4	43.0		9.4	23.6	21.4	
9.0	38.1	15.1		6.5	16.5	39.5	L	8.8	39.6	58.2		9.3	21 0.8	14.1		9.5	40.1	23.8	
9.4	41.9	49.9		9.5	26.2	16.3		9.3	39.8	43.5		9.0	1.0	25.8		9.5	44.3	36.1	
9.2	45.2	31.6		9.2	34.9	42.3		9.4	47.0	58.2		9.2	40.9	37.5		8.0	46.7	1.6	A
8.7	3 1.9	37.0	B	9.1	46.8	46.7		9.5	59.0	0.5		9.4	43.8	54.0		8.2	48.6	9.3	A
9.2	8.8	32.8		9.5	10 0.2	37.9		9.5	16 5.1	31.3		9.4	45.4	7.7		9.0	29 15.9	30.7	
7.2	14.5	12.6		9.0	17.8	53.8		9.5	6.3	5.7		9.5	55.1	45.8		9.1	48.9	26.2	
9.4	14.6	28.3		9.2	28.0	48.6		8.2	13.0	23.9	A	9.0	57.8	26.9	A	9.4	58.0	8.3	
9.5	28.3	19.6		7.7	42.8	41.7	L	9.5	20.9	15.4		9.3	22 4.6	59.4		9.1	58.6	35.9	A
8.0	30.3	45.5	A	9.5	56.0	43.6		9.4	27.0	50.7		9.5	7.2	44.5		9.5	30 9.6	38.5	
9.4	32.2	37.8		9.4	11 18.1	25.8		9.5	35.3	0.3		9.5	31.8	6.4		8.9	31.9	45.4	
7.2	36.8	44.6	A	9.5	28.5	20.2		9.5	38.5	6.0		9.5	39.0	57.2		9.3	31 3.1	26.5	
9.5	38.5	11.0		8.5	30.4	57.2		9.5	52.0	16.9		9.5	46.1	28.8		9.2	10.0	20.7	
9.5	47.2	38.2		8.5	34.8	7.4	B	8.2	53.1	42.9	A	9.5	23 2.0	28.7		6.0	10.4	33.4	A
9.5	4 17.1	20.8		9.2	47.7	30.6		9.5	17 2.0	31.6		9.0	37.6	15.9		9.0	27.2	42.2	
9.3	28.7	9.8		9.4	49.9	10.8		9.3	3.4	49.1		9.5	49.5	40.4		9.5	32.6	59.0	
9.1	43.6	8.2		9.2	53.0	31.3		8.7	7.0	1.5		9.5	57.4	40.1		8.0	34.1	46.3	A
9.3	59.3	34.5	A	9.5	12 7.8	10.6		9.0	9.5	42.9		9.5	59.4	21.3		9.5	35.3	6.6	
9.4	5 3.8	0.8		9.5	19.5	0.7		8.4	19.9	16.4		9.5	24 5.6	4.9		9.5	36.4	3.8	
8.8	6.0	18.8	A	9.5	22.3	18.2		9.5	41.0	51.0		9.4	9.5	30.6		9.3	40.5	49.8	A
9.4	31.8	5.9		6.4	25.0	3.4	A	9.0	45.1	40.7	A	8.7	16.0	59.0		9.5	46.7	1.3	
7.0	45.0	55.3	A	8.2	32.0	57.7	B	9.3	18 2.0	56.2		9.5	21.3	50.7		9.5	51.0	29.1	

201—260				261—320				321—380				381—440				441—500			
	0ᵐ		+48°		0ᵐ		+48°		0ᵐ—1ᵐ		+48°		1ᵐ		+48°		1ᵐ		+48°
m	′	″	′		m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
8.8	31	56.2	33.0	A	9.5	44	23.8	40.0	9.0	53	39.7	12.8	9.3	7	9.2	57.1	9.5	19	18.0	26.5
9.5	32	15.4	24.8		9.5		28.1	38.2	7.8		45.8	41.3	A	9.1		27.4	6.1	9.5		20.9	56.3
9.4		23.9	23.7		9.0		33.6	19.5	9.5	54	6.8	7.4		9.0		36.7	51.7	9.4		21.0	18.6
9.5		47.5	31.2		9.3		33.7	28.8	9.5		13.8	13.9		9.3		42.0	27.2	9.5		41.0	6.5
9.5		52.0	7.2		9.5		34.5	49.8	9.4	55	13.5	36.9		9.3		49.2	30.5	B	9.5		59.5	29.5
9.4	33	10.4	40.7		8.8		40.7	55.3	A	9.5		14.6	41.0		9.3		58.1	19.6		8.9	20	3.6	58.3	A
9.5		12.0	17.0		8.5		46.1	39.3	B	7.0		33.9	5.0	B	9.5	8	30.9	27.1		9.5		40.4	58.9	
9.1		44.4	54.3		9.5		47.1	47.6		7.2		34.8	56.9	A	9.2		38.8	8.7		8.3		41.9	25.0	
8.7		52.7	49.3	A	9.5		48.7	35.4		7.8	56	2.0	25.6	B	9.5		57.7	13.0		9.5		55.4	34.9	
9.4	34	19.5	32.6		9.5		54.7	29.8		8.0		6.4	50.9	A	9.2	9	6.9	5.7		9.5	21	7.6	54.7	B
9.5		31.9	7.1		9.5	45	1.1	44.3		9.5		23.9	16.5		8.0		8.4	59.3	A	9.5		22.2	32.7	
9.0		35.8	47.0	A	7.8		5.1	52.2	A	9.2		33.7	53.2		6.9		13.2	14.9	A	9.4	22	1.6	55.5	
9.0		42.5	34.2	A	9.3		5.3	41.6		9.0	57	13.2	31.5		9.4		14.3	16.1		6.9		13.0	35.7	A
9.5	35	15.8	51.3		9.5		14.0	46.9		9.4		33.0	23.6		9.2		15.3	24.8		8.8		43.7	17.3	A
8.5		20.0	48.0	A	9.4		24.7	44.1		9.5		40.9	23.0		8.5		29.8	59.9	A	8.9		43.9	2.3	B
9.5		32.2	33.4		9.5		26.6	48.6		8.7		50.7	17.6		8.5		30.2	20.0	B	9.5		49.4	41.9	
9.4		38.0	7.9		9.5		30.0	58.0		6.7	58	48.0	46.9	A	8.5		37.4	44.8	A	9.5	23	19.8	28.2	
9.3		52.3	23.2		9.5		31.4	0.6		9.5		55.4	15.1		9.5	10	8.5	23.0		9.5		41.4	46.3	
6.9		55.6	16.5	B	9.5		40.7	47.5		9.5	59	12.5	23.2		9.5		13.2	47.5		9.1		57.6	45.8	
9.2	36	0.7	16.3	B	8.8		43.5	3.4	A	9.1		12.5	24.0		8.8		16.0	42.5	A	9.5	24	16.3	12.8	
9.5		14.0	53.3		9.5		43.6	9.0		9.1		12.5	15.3		8.8		16.5	49.3	A	9.1		22.0	25.5	
9.3		16.0	48.7	A	9.5		56.0	53.0		9.5		16.0	23.3		9.5		26.8	35.6		9.4		22.9	31.4	
9.5		46.9	36.9		9.5	46	4.8	37.6		9.1		48.9	28.2		9.5		43.5	29.6		8.3		33.6	15.8	A
9.5		49.1	36.5		9.5		9.4	20.6		9.5	0	20.0	39.0		8.8		45.4	12.1		9.4		35.0	55.1	
9.5	37	16.6	8.8		9.3		19.3	48.2		9.4		21.4	13.7		9.2		50.5	55.4		9.2		36.1	52.0	
9.4		24.0	40.9		9.5		24.0	41.5		9.5	1	7.5	41.4		9.5	11	20.0	39.4		9.4		40.6	50.2	
9.5		43.9	14.7		9.2		36.7	48.3		8.4		17.7	36.8		9.5		52.7	59.3		8.5		46.8	44.9	A
9.5		55.4	1.6		7.1		40.1	36.8	A	6.9		24.1	16.7	A	9.0	12	38.0	52.5		8.9	25	6.6	56.9	A
9.4		58.5	50.0		9.4		58.4	52.0		9.1		37.5	4.1		8.8		39.3	59.5	A	9.5		19.1	34.9	
9.3	38	15.4	58.4		9.2	48	23.1	38.6		9.2		46.8	29.9		9.5	14	6.4	27.6		7.3		38.4	49.0	A
8.8		16.8	53.4	A	9.0		32.9	36.9		9.5		59.8	12.9		9.1		8.9	33.3		9.5	26	12.9	28.5	
9.0		22.1	11.5		9.5		47.8	18.9		8.4	2	5.8	30.3	A	9.4		21.3	14.8		9.5		46.5	16.8	
9.5		34.4	1.3		9.2		48.3	8.0		8.8		10.7	14.2		8.9		32.7	47.0		8.8		56.4	1.0	A
9.5		40.5	43.1		9.5		54.8	47.8		9.4		21.6	20.8		9.1		34.3	19.6	B	9.5		59.0	22.0	
9.5	39	5.4	7.8		9.5	49	28.0	42.7		7.3		23.7	23.2	A	9.5		50.0	56.1		9.4	27	6.0	22.2	
7.8		19.6	51.7	A	9.5		33.9	34.8		9.2	3	0.4	16.5		9.2		52.4	44.2		9.2		6.4	57.2	
9.2		40.4	35.3		9.5		47.0	8.2		7.6		9.6	51.7	A	8.8	15	0.0	30.1	A	8.5		18.9	27.8	
8.7	40	2.0	9.2		9.2		58.5	24.8		9.5		11.3	6.0		9.5		32.9	5.1		9.4		28.8	39.9	
9.2		8.3	9.3		9.5		58.5	45.0		9.5		19.4	38.3		9.3		38.1	20.2		9.5		33.7	11.1	
9.0		12.4	58.5		8.8	50	0.8	58.7		8.7		43.0	22.7		9.5		47.5	27.5		9.5		50.3	25.3	
7.4		16.5	55.4	A	7.2		24.9	23.7	B	8.6		44.2	50.0		9.2		53.8	37.2		9.1		54.2	59.0	
9.4		36.8	59.9		7.9		28.5	8.9		9.4		50.8	12.9		8.4		57.8	1.0	A	7.2	28	14.7	20.3	A
9.5		38.0	13.9		9.5		36.8	55.9		9.4		59.6	4.1		9.5	16	11.9	25.1		9.5		18.3	5.8	
9.1		57.1	10.9		9.5		46.8	26.6		9.5	4	45.4	26.4		9.5		19.8	13.3	B	9.1		22.0	22.4	
8.8	41	4.9	12.0		9.5		55.2	51.5		7.5		49.2	30.2	L	9.5		22.0	13.8		9.5		23.3	4.4	
9.5		11.4	2.8		9.5	51	8.7	36.3		9.5		50.0	19.5		8.0	17	12.9	28.5	A	9.0	29	5.7	20.2	A
9.2		44.9	21.2		9.5		9.0	39.8		9.4		50.4	47.1		9.5		15.5	54.6		9.5		7.1	46.5	
8.7		58.8	32.2		9.5		12.9	44.2		9.5	5	8.6	7.2		9.4		30.3	57.3		9.0		11.9	41.4	
7.3	42	2.8	36.1	L	6.5		13.9	11.0	B	7.5		17.8	1.0	G	9.0		45.6	8.8		8.5		15.4	28.7	A
8.2		23.2	6.0	B	9.2		14.2	26.8		8.5		23.7	28.1		8.5		50.0	52.9		9.1		28.7	33.2	
9.5		25.0	46.9		9.0		32.6	48.4		9.5		31.1	1.1		9.3	18	3.7	22.9	B	9.5		34.6	25.6	
9.5		36.9	14.0		8.5		55.9	21.2		9.4		49.4	3.9		9.5		14.2	37.6		9.4		36.5	36.8	
9.5		55.5	53.3		8.5	52	6.8	41.1		9.5	6	0.9	5.4		9.4		18.0	57.1		8.9		49.3	10.1	
9.5		55.5	17.6		9.5		38.4	42.0		7.0		2.2	39.9	L	9.4		26.3	27.2		9.3		53.8	27.3	A
9.5	43	3.1	3.8		8.8		51.2	59.3	A	9.2		3.8	47.3		8.0		36.7	47.4		9.5	30	20.5	15.8	
9.1		21.6	46.8		9.3		53.8	5.9		9.4		9.6	6.6		8.4		46.6	29.3		9.1		24.3	52.5	A
7.5		39.3	11.6	L	8.7		55.6	23.4		9.5		33.1	57.0		9.5		57.0	33.4		9.4		45.8	15.8	
9.2		47.2	6.2		9.5		56.9	31.5		9.3		38.7	59.5		9.5		59.1	8.7		9.4		49.3	27.9	
8.7		50.0	6.6		9.3	53	6.0	13.5		9.2		41.8	18.9		8.7	19	1.5	45.5		9.5	31	6.5	3.9	
9.5	44	15.7	57.5		6.2		7.0	45.7	A	9.3	7	4.0	56.8		9.4		12.9	15.4		9.5		21.7	46.9	

501—560				561—620				621—680				681—740				741—800			
	1u	+48°			1u—2u	+48°			2u	+48°			2u	+48°			2u	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	31 44.0	4.9		9.5	46 0.2	41.5		7.5	3 40.1	42.4	A	8.5	19 12.4	54.7	A	9.4	33 12.6	12.8	
9.5	59.5	40.8		9.5	5.7	57.6		9.0	46.6	48.0		8.5	14.0	57.2	A	9.5	21.0	26.1	
8.5	32 0.3	32.6	A	9.5	52.5	18.6		9.5	49.0	50.1		9.1	24.0	25.9	B	9.4	25.2	28.7	
7.7	5.9	22.1	A	9.5	55.5	52.2		9.5	4 0.8	51.8		9.5	50.8	26.6		9.5	34 0.8	51.8	
9.5	20.5	15.9		9.5	47 15.6	3.2		9.5	14.4	1.6		9.2	20 0.2	28.9	R	9.2	7.2	55.7	
9.5	28.2	25.5		9.5	32.9	12.7		8.8	27.0	29.0	A	9.5	7.6	47.0		4.2	20.0	37.0	A
8.3	48.9	34.3	A	9.5	45.7	55.5		8.4	34.2	41.8	A	9.3	28.8	1.8		9.1	39.9	5.1	
8.7	54.1	23.3	B	9.5	49.7	37.7		8.0	49.7	24.5	A	9.2	39.3	53.2		9.5	45.7	42.3	
9.5	57.1	23.7		9.3	48 8.0	46.5		9.0	50.2	39.7	A	9.2	21 13.6	33.2	B	8.8	52.8	4.1	
9.3	33 42.9	13.5		9.5	20.0	9.6		9.5	59.2	42.3		9.5	22 1.3	8.2		8.5	35 54.7	19.6	A
9.5	45.5	7.9		9.5	23.5	29.5		8.0	5 5.1	24.1	A	9.0	29.0	18.3	A	9.5	36 6.9	51.7	
9.5	34 5.0	30.6		9.3	25.7	25.1		8.3	7.4	47.3	A	9.3	45.1	39.5		8.8	33.1	44.8	A
9.5	14.3	22.9		9.5	35.6	12.1		6.8	30.8	6.7	L	9.3	47.7	43.0		9.5	44.0	22.8	
9.5	29.5	15.2		7.3	51.4	56.2	L	9.3	6 1.6	36.2		9.4	23 19.2	12.9	A	9.4	46.0	43.8	B
9.4	39.1	54.6		9.3	49 13.2	52.0		8.1	4.7	31.7	A	8.6	21.6	13.0	A	8.8	53.6	15.2	
9.5	41.6	2.0		6.2	22.9	29.7	G	9.0	9.6	40.6	A	8.1	24 6.0	52.0	B	8.6	37 12.3	28.8	
9.4	52.5	58.8		9.1	50 0.7	30.3		9.4	11.0	21.0		8.5	22.7	27.9	A	8.2	32.3	27.7	A
7.3	53.7	55.3	L	8.7	7.2	20.4		9.0	16.7	25.9	A	9.0	23.5	42.7		8.5	56.9	42.7	
9.4	35 20.9	49.2	A	9.2	25.6	58.2		8.5	16.8	52.5	A	9.1	33.1	50.1	B	9.5	38 22.5	39.4	
9.5	27.1	48.0		8.0	33.8	46.5	L	9.2	44.9	27.7		8.8	46.4	3.3	B	8.5	22.5	36.5	
9.5	36 16.0	43.0		9.4	51 17.5	27.9		9.4	54.9	37.2		9.4	25 8.2	46.1		9.5	37.2	11.6	B
9.5	56.8	24.7		9.4	19.0	37.4		7.6	7 8.0	12.1	L	9.4	40.9	26.7		7.0	57.9	34.1	L
9.5	37 7.5	59.1		9.5	26.1	56.8		9.5	17.4	28.7		9.5	42.2	29.8		8.0	39 24.4	41.5	L
9.0	44.8	43.6	A	9.5	45.5	52.4		9.4	46.8	51.7		9.0	43.1	0.7	A	8.3	40.0	16.5	
9.4	38 2.7	54.6		9.1	52 45.5	0.1		9.4	49.6	12.6		9.4	26 3.3	23.2	B	7.8	40 6.7	11.7	B
9.5	21.3	43.5		9.5	53 9.3	57.3		9.4	9 1.0	3.5		9.4	38.0	34.3		9.0	22.5	4.2	
9.5	36.0	1.4		8.8	9.8	7.1	A	8.3	27.6	14.2	A	9.3	43.9	39.3	B	9.5	38.4	36.0	
9.3	39.9	0.7		8.8	9.8	34.8	A	6.7	58.1	15.7	A	9.1	56.3	43.0		9.5	43.4	27.4	
9.5	53.8	5.4		9.5	16.4	42.4		9.5	10 4.5	53.8		9.0	27 24.2	49.7		9.2	52.2	6.5	
8.7	39 15.9	42.3		9.5	54 7.3	51.1		9.0	29.2	34.8	A	8.2	31.8	35.3	B	8.4	41 16.2	44.9	A
8.7	16.4	30.0	A	9.5	16.0	15.4		9.5	52.4	51.2		9.4	54.7	1.5		8.6	27.0	10.3	
9.5	51.4	56.3		9.5	40.0	20.7		8.3	11 31.6	41.1	A	9.5	28 37.4	1.1		9.2	37.8	55.3	
9.5	40 11.6	10.6		9.5	49.8	18.7		8.5	38.3	7.7		9.1	52.8	7.2	A	9.5	58.0	35.4	
8.8	11.9	37.1	A	9.1	55 0.2	14.2		9.5	12 20.5	56.7		9.4	59.6	0.9		9.2	42 4.5	8.2	
8.5	19.3	42.0	A	9.0	31.0	51.7		8.5	13 13.4	16.3	A	9.1	29 15.7	32.6	A	9.5	8.4	22.9	
9.5	39.7	49.0		9.5	37.0	3.1		9.3	39.9	51.8		9.1	27.2	35.6		9.5	12.0	54.2	
9.5	52.3	59.2		9.1	56 27.1	51.0		9.4	44.4	14.3		9.1	29.7	32.2		8.5	17.8	16.5	
8.3	53.2	32.1	A	8.8	37.2	30.2	A	8.8	52.2	20.9	A	9.4	41.6	27.9	B	9.5	19.6	28.7	
9.5	53.6	0.6		9.4	43.2	0.6		8.0	53.5	31.1	B	9.4	30 24.0	16.0		9.5	28.0	48.8	
9.5	41 43.6	46.9		8.0	54.4	27.7	A	9.4	56.1	56.0		9.3	29.7	14.0	B	8.5	28.1	1.6	
9.5	48.0	21.9		8.8	57 0.5	43.3		9.0	57.6	22.4	A	9.3	33.1	4.2		9.5	29.9	21.0	
9.5	48.2	2.7		9.3	4.3	53.7		8.3	14 14.6	40.3	S	6.7	36.5	55.7	A	8.5	35.7	54.0	A
9.5	42 2.6	20.2		8.4	44.3	55.6	A	8.5	17.1	14.5	A	9.4	53.3	14.4		7.2	48.0	12.8	A
9.5	15.2	32.2		9.4	58 0.3	11.6	A	9.0	20.2	46.1		9.4	31 0.0	10.5		9.5	50.0	18.6	
9.5	37.1	26.8		8.6	2.8	10.0	A	8.9	40.9	12.2	A	9.3	7.1	9.4	B	9.4	52.9	21.5	
9.4	37.5	54.6		9.5	59 40.5	20.6		9.1	51.4	31.7		9.4	8.5	12.6		9.4	54.9	6.4	
9.0	46.1	55.5	B	9.5	42.8	49.7		9.5	15 31.0	5.1		9.4	10.1	26.5		8.9	59.6	23.3	B
9.3	48.2	2.5		9.5	57.5	47.5		9.1	45.3	23.9		9.4	10.4	32.8		9.5	43 15.6	59.0	
9.5	54.2	45.6		9.4	59.8	39.9		9.5	16 19.1	1.2		9.1	25.6	14.2	B	9.3	53.8	39.2	
9.5	43 25.4	23.2		9.4	0 5.4	3.5		8.4	30.5	36.2	B	9.1	51.8	9.8		8.7	55.7	46.2	
9.5	34.0	31.3		9.5	9.1	25.9		8.9	56.2	22.8		8.5	32 5.3	19.5	A	8.7	44 26.0	24.5	A
9.4	44 13.2	12.5		9.3	16.6	14.2		9.4	17 10.0	35.5		8.9	8.3	48.1	A	9.0	45 5.6	53.3	
7.2	22.0	43.3	A	9.0	40.9	43.7		9.5	14.6	44.7	B	9.2	8.6	31.6		9.3	15.5	1.6	
9.5	45 2.7	23.0		8.7	1 6.1	5.3		9.5	19.5	41.7		8.4	11.3	0.7	A	8.9	19.4	7.1	A
8.2	2.7	35.2	A	9.5	37.8	56.2		9.1	28.2	23.3		8.4	17.6	47.6	A	8.6	26.7	19.2	A
9.3	22.0	30.5		9.4	41.2	14.7		9.5	54.3	55.8		9.3	28.0	28.7		9.5	48.0	8.6	
9.5	28.6	20.7		9.1	2 25.7	46.6	A	8.9	18 42.7	14.7	A	8.4	28.7	47.0	A	9.5	46 14.2	48.9	
8.8	30.5	22.5	A	7.8	32.2	54.7	A	9.5	57.5	9.6		8.5	59.5	57.6		9.5	23.8	2.9	
9.5	39.5	9.1		9.5	42.7	3.2		9.2	58.3	53.4		9.1	33 9.5	21.8		9.3	30.7	0.8	
9.5	55.5	17.3	B	9.4	3 25.0	8.6		8.1	19 4.1	38.3	A	8.6	12.2	17.9	A	9.0	52.5	0.8	

801—860				861—920				921—980				981—1040				1041—1100			
	2ᵐ—3ᵐ	+48°			3ᵐ	+48°			3ᵐ	+48°			3ᵐ	+48°			3ᵐ—4ᵐ	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	46 53.5	7.8		9.3	2 22.4	31.1		9.2	17 59.5	13.2		9.4	33 14.9	5.8		9.5	56 2.5	13.7	
9.1	55.6	9.8	B	7.8	57.4	27.6	L	9.2	18 10.2	32.7	B	9.5	20.7	53.6		9.4	19.4	39.3	
7.3	47 0.3	7.0	A	9.5	3 16.5	34.0		9.3	14.3	25.9		9.3	31.5	50.6	B	9.5	38.9	44.7	
9.2	24.1	25.2	A	9.5	4 1.9	27.8		8.8	19.9	52.0	A	6.5	44.0	3.8	L	8.8	40.5	42.3	
9.5	43.2	58.5		8.9	10.7	1.8	B	9.3	27.3	33.2	B	9.5	34 3.4	29.5		9.5	41.2	21.1	
9.5	43.5	10.5		9.3	13.4	26.3		9.4	29.2	6.5		9.5	40.4	31.8		9.1	49.0	30.9	
9.4	56.3	54.3		9.4	17.3	50.8		8.1	35.9	33.5	A	8.1	45.4	1.4	B	9.5	53.0	0.0	
8.2	58.0	17.1	A	8.2	38.2	1.7	B	9.5	52.7	14.5		9.3	50.5	0.4		8.5	57 23.5	23.0	
9.5	48 1.4	48.7	B	9.5	40.4	30.5		9.3	19 7.3	27.4		9.3	58.9	7.7		9.5	58 27.6	9.4	
9.5	2.8	50.8		7.5	49.0	9.0	A	8.7	28.2	39.5	G	8.3	36 15.4	20.4	A	9.5	55.7	56.5	
9.0	28.6	58.9		9.4	5 12.3	54.3		8.8	28.7	30.3	B	9.4	22.2	18.3	A	9.3	59 56.4	59.5	
9.1	42.7	11.6		8.8	22.4	0.1		9.4	32.4	20.9		9.3	37 11.4	51.5		9.4	57.1	9.7	
9.3	46.8	28.2		8.0	23.8	36.7	B	8.2	32.9	42.6	G	8.9	24.6	52.3	B	9.5	0 20.9	2.9	
8.5	57.0	55.6	A	9.5	6 23.7	41.7		9.0	20 4.3	0.2		9.4	39.5	27.2		9.4	38.7	27.5	
9.5	49 16.6	32.8		8.5	54.9	8.0	A	9.4	56.5	31.8		8.8	45.2	46.8		9.4	59.0	32.9	
9.5	22.4	37.1		9.3	7 6.8	57.5		7.9	59.0	56.0	A	8.5	57.5	5.8	A	9.2	1 30.7	8.2	A
9.5	27.9	20.9		9.3	12.4	36.2		9.5	21 8.6	29.1		9.1	38 8.4	40.3		9.0	2 0.1	4.5	A
9.5	36.6	2.8		9.3	21.9	38.8		6.5	8.9	41.4	A	8.5	14.4	20.9	A	9.1	1.6	14.0	A
9.5	44.2	28.1		8.6	59.9	42.9		9.3	16.9	4.2	B	9.0	26.3	14.1	A	7.0	58.9	41.8	A
9.4	44.6	29.6		9.0	8 0.9	23.8		9.2	24.8	39.5	B	9.5	27.5	57.7		9.4	3 28.8	53.5	B
9.4	50 5.8	42.0		9.3	1.0	15.4		7.8	25.4	27.0	G	9.0	42.5	4.0	A	9.1	41.5	39.8	
9.5	28.2	14.5		9.1	13.6	49.9		7.0	28.7	54.3	A	8.5	39 5.9	38.4		9.3	4 9.4	1.2	B
9.3	35.9	1.7		9.1	37.3	56.4		7.0	36.2	14.1	B	9.5	8.2	7.0		4.2	17.0	2.2	A
9.5	51 0.7	30.9		9.5	9 0.8	47.3		8.5	39.1	5.5		9.4	45.5	24.2		9.1	17.9	40.8	A
9.4	7.5	2.3		8.5	29.4	22.1		9.5	22 37.0	55.8		8.9	48.2	34.5	B	8.4	30.3	48.5	A
9.1	8.0	17.5	B	7.5	38.3	6.8	A	9.3	40.9	48.2	A	9.4	58.3	27.2		9.5	32.9	22.1	
9.5	12.2	42.9		9.2	46.4	52.2		9.4	23 29.9	6.1		9.4	40 7.9	13.5		9.1	39.3	18.9	
9.2	16.2	16.7		8.0	11 2.7	19.0	A	9.4	47.9	6.6		8.8	17.5	8.3	A	9.5	5 55.7	3.9	
9.5	48.0	29.2		9.2	16.5	59.8		7.5	53.6	8.0	A	9.5	30.1	8.2		9.5	6 23.6	2.9	
9.5	52 1.0	41.5		9.3	17.9	51.3	B	8.9	24 2.4	10.0	A	9.4	41 47.1	48.5	B	9.4	30.3	54.6	
9.3	18.1	1.7		9.5	18.3	6.4		9.3	20.0	49.2	A	9.4	42 19.8	51.5		9.2	42.1	59.3	
9.5	38.2	6.3		9.3	26.1	35.6	B	9.5	44.4	54.0		9.3	25.6	6.1	B	9.4	44.2	32.3	
9.4	39.9	36.5		6.5	36.9	32.8	G	8.4	44.4	39.2	G	9.4	46.1	5.8		9.0	7 16.3	50.9	
9.1	53 9.9	11.5		8.9	44.0	40.5	R	9.5	49.9	9.6		9.4	49.7	14.6		9.5	29.0	44.5	
9.5	10.8	19.7		9.3	12 0.3	48.0		9.5	25 13.8	40.6		6.2	43 9.3	12.8	B	9.3	29.8	41.1	B
9.2	24.0	35.5		9.2	40.4	15.0		9.4	36.6	8.9		9.1	14.9	27.9		8.0	30.8	19.6	A
8.6	28.9	10.8	A	8.6	52.4	52.7		9.3	26 6.2	46.1	A	9.5	22.8	29.5		9.5	8 29.4	2.6	
9.1	37.8	13.9		8.0	56.9	6.5	B	9.2	9.3	10.1		8.2	44 27.9	22.3	B	8.2	34.8	51.6	A
8.7	40.2	6.9	A	6.2	58.4	40.6	A	9.1	21.8	11.2		7.0	52.0	36.9	A	9.5	43.5	10.3	
9.5	49.5	41.3		8.4	13 6.6	51.4	B	9.3	50.6	35.6		8.9	45 7.8	26.8	A	9.5	9 2.9	37.2	
8.8	55.2	48.9		9.3	29.5	6.5		9.2	27 7.0	35.2	B	9.4	46 52.5	38.3		9.4	10.2	59.0	
9.4	57.8	55.2		9.2	32.0	1.7		7.5	51.3	35.6	A	8.6	47 29.4	19.1	A	9.4	21.6	59.0	
9.4	54 1.2	51.7		7.0	36.4	4.9	A	7.0	28 3.4	44.6	A	8.8	48 43.1	59.2	A	9.5	10 19.3	48.9	
9.5	55 10.9	34.5		8.4	39.9	17.1	A	8.7	15.2	7.1		7.5	48.0	20.1	A	8.5	30.4	24.0	A
9.0	35.4	18.0		8.8	14 3.5	40.0		8.9	24.3	55.6		9.4	50 52.9	20.6		9.2	34.2	18.8	B
9.3	56 5.4	57.3	B	8.0	14.9	35.6	A	9.3	29 6.7	36.0	B	9.5	58.1	41.3		9.0	45.0	49.8	A
7.8	14.4	41.7	A	8.5	53.0	44.0	B	9.4	30.8	54.2		9.5	52 1.3	52.4		9.4	11 9.0	58.1	
9.2	57 0.0	15.0	A	8.5	57.8	39.1		8.0	44.4	29.4	A	9.4	12.3	9.1		9.5	42.5	0.2	
9.0	11.6	28.4	B	8.1	15 3.4	48.5	A	8.9	30 10.9	25.0	A	7.0	46.5	26.5	L	9.5	50.7	20.5	
9.3	16.1	32.2		8.8	3.4	23.0	A	9.3	19.2	46.1		8.6	58.2	9.1		8.3	12 34.3	13.5	A
9.2	43.5	33.5		9.5	30.8	51.9		9.5	20.9	7.0		9.4	59.8	23.6		8.5	13 1.2	49.4	A
9.3	58 17.6	11.4		9.4	32.5	31.0		9.3	25.6	38.3		7.9	53 20.5	15.2	L	9.2	28.5	16.0	
8.1	59 31.7	4.0	B	6.5	41.4	35.2	A	9.3	49.1	24.5		8.9	44.2	56.8	B	9.5	14 46.7	40.6	
9.3	33.4	0.4		9.4	16 27.8	22.0		9.3	31 1.4	48.6		9.0	59.5	21.6		9.1	47.2	7.8	
9.3	33.7	43.5		9.5	40.4	30.8		9.5	8.8	9.0		9.4	54 14.1	8.4		9.5	16 23.5	37.2	
9.4	58.4	36.3	B	9.5	45.5	16.5		9.3	43.9	34.7		8.8	28.9	3.3		7.5	38.2	26.8	A
9.3	0 33.9	33.7		9.2	17 1.2	41.8		9.4	32 7.0	58.0		9.0	29.7	28.5		8.0	17 33.8	53.1	A
9.3	1 20.7	1.4		8.8	14.9	32.5	A	8.7	29.9	43.5	A	9.0	38.0	24.5		9.2	54.1	16.1	B
9.2	27.9	42.8		9.5	32.3	48.1		9.3	34.0	29.8		9.5	55 4.4	38.4		9.5	18 4.3	13.0	
8.8	2 18.0	37.3		6.0	45.4	33.5	A	9.3	44.5	7.4		9.4	16.7	44.4	B	8.4	30.4	43.5	A

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	4ᵘ		+48°		4ᵘ		+48°		4ᵘ—5ᵘ		+48°		5ᵘ		+48°		5ᵘ—6ᵘ		+48°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.5	18	56.0	5.7	9.5	40	19.5	0.5	9.2	56	58.7	11.2	A	9.0	21	54.3	8.2	9.0	55	11.6	47.4	A
9.5	20	32.1	2.8	5.8		17.4	28.8	A	8.5	57	11.2	23.6	L	9.5	22	16.9	43.5	9.4		12.9	28.8
9.5	21	10.3	28.8	9.4		57.7	38.2		9.5		12.2	5.5		7.5		39.8	11.6	L	9.5		23.5	42.1
9.0		25.5	58.7	A	9.5	41	15.2	32.8		9.5		16.5	12.8		9.5	23	30.0	22.3	9.5	56	3.8	24.3
9.5	22	15.2	43.0	A	9.5		19.8	21.4		9.5		39.8	4.5		9.5		35.2	39.1	8.8		15.2	30.7
8.5		45.0	22.9	A	8.9		44.0	36.6	B	7.0	58	2.7	55.5	B	9.5		40.4	36.0	8.3		57.3	42.6	B
9.4	23	13.0	52.0		9.4		44.7	43.5		8.3		32.6	11.9	A	9.3		47.5	1.4	B	9.5	58	11.2	9.2
9.5	24	3.3	9.1		9.5	42	11.2	53.2		9.5		33.5	43.2		7.5		48.9	56.3	A	9.5		13.8	35.7
9.4		32.4	41.1		9.2		22.2	10.1		9.5		58.2	9.3		9.5	25	44.0	22.8	8.3	59	2.1	58.7	A
9.5		55.8	40.6		8.9		23.2	11.6	B	9.5		59.2	5.1	B	9.2	26	11.3	8.2	9.4		17.3	9.7
8.5		56.8	29.0	A	9.4		26.7	20.9		9.5	59	37.3	1.2		9.5		28.3	42.5	9.5		34.1	51.9
9.5	25	12.8	13.1		9.5		45.4	6.4		9.5	1	1.4	29.7		9.5	27	50.2	28.9	6.0	0	30.2	44.9	A
9.3		13.4	6.5		8.8	43	19.8	20.9		9.3		37.0	6.1		9.5	28	26.3	17.1	9.5		34.3	38.2
9.2		30.5	57.2		9.4		22.3	29.8		9.5		52.9	50.8		8.7	29	41.7	14.1	A	9.5		43.9	12.1
8.3		34.2	55.7	A	8.6		53.7	48.5	A	8.4	2	0.6	7.8		9.0	30	1.7	56.4	A	9.3	1	3.9	39.0
9.5		54.5	48.5		9.5	44	41.8	52.3		9.4		4.8	32.2		9.0		14.6	58.0	A	9.4		14.3	31.2
8.9		59.2	41.5	A	9.5		47.3	46.5		9.2		38.0	14.9		7.0		43.7	22.4	A	9.5		37.2	32.1
9.3	26	0.3	53.4		9.5	45	23.2	22.9		9.1		41.2	44.1		9.5	31	13.3	17.6	8.0	2	7.7	30.7	A
7.4		21.6	5.4		9.5		47.7	58.7		9.2	4	6.9	26.7		9.4	32	21.0	10.2	A	9.1		38.3	3.7	A
9.5		23.4	23.9	B	9.4		51.8	16.2		9.0		8.6	33.3		9.5		42.7	5.3	9.5		38.8	37.2
9.5	27	21.8	39.6		9.5	46	8.5	8.3		8.5		13.3	11.3		8.8	33	44.4	54.3	7.7	4	3.3	52.1	B
9.5		51.1	10.6		9.1		40.6	32.4	A	9.5		56.4	25.8		8.0	34	27.7	54.9	A	9.1		11.9	12.0
9.3	29	13.8	10.6		9.5		43.1	2.5		9.1	5	37.6	13.3		7.5	35	40.7	36.2	A	9.5		12.0	6.8
9.5		19.5	24.3		9.0		54.5	13.7		9.5		47.3	21.5		9.5	36	54.7	12.1	9.1		12.7	14.5
9.5		30.2	32.7		9.3		59.0	58.0		8.0	6	28.9	46.5	A	9.5	37	2.3	56.0	9.5	5	5.3	8.2
8.8	30	9.5	21.4	A	9.3		59.2	48.1		9.4		50.0	43.0		9.5		29.7	33.2	9.5		28.6	56.9
9.4		11.3	3.0		9.5	47	12.3	19.0		9.0	7	17.3	19.5		9.5	38	50.3	45.6	9.5		30.2	15.0
6.0		36.9	0.8	A	8.5		35.8	6.9	A	6.5		30.8	46.0	A	9.5		59.7	19.1	9.5	6	23.7	3.2
9.5		46.2	38.6		9.5	48	3.3	4.0		8.9		51.1	53.7	A	9.3	39	17.9	40.2	8.9	7	38.8	0.8	A
9.5	31	16.5	23.8		9.3		13.5	25.3	A	8.9		55.4	53.7	A	9.1		28.7	16.6	9.4	9	9.4	45.0
9.5		20.0	2.0		9.2		29.2	41.3		9.1	8	56.1	59.9	A	8.0	40	10.7	33.8	A	9.4		58.7	42.1
9.4		57.5	11.4		9.2		30.3	20.6	A	9.5	9	24.5	10.2		9.3		26.4	19.9	9.5	10	32.0	31.7
9.4	32	5.8	55.5	B	8.5	49	49.6	34.5	A	9.2		44.6	48.1	A	9.0		32.3	42.0	L	9.4		33.8	44.0
9.5		39.7	14.5		9.4	50	7.8	50.6		8.9	10	5.9	34.7	A	9.1		42.9	41.2	S	9.1	11	6.5	53.9
9.5	33	10.1	5.5		8.7		28.4	44.6	A	9.0		26.9	23.3	A	9.5	41	32.0	1.4	9.1		25.7	34.1
9.5		22.3	28.3		8.3		34.2	36.3	A	8.6		58.3	36.2	A	9.4	42	46.8	39.2	9.5		37.8	27.8
9.4		31.5	22.4		9.2		34.5	35.2	A	9.4	11	8.4	39.7	A	9.5		55.7	0.4	9.5		40.2	2.3
9.3		50.6	59.7		9.4		36.4	57.6		8.9		36.1	51.5	A	8.3	44	17.3	58.3	A	9.5		56.9	49.5
9.5		54.0	22.0		9.5		37.5	7.4		9.5		41.2	13.0		9.4	45	1.8	40.1	9.4	12	48.7	2.8
9.5	34	8.8	40.1		9.3		40.0	51.9		9.4		57.3	25.8	A	9.5		2.7	49.5	8.9	13	8.8	44.5
8.9		24.5	58.3	A	9.1	51	25.7	33.9	A	9.5	12	16.4	56.3		9.5		30.0	21.0	9.5	14	32.3	47.0
9.5		27.7	3.8		9.5		35.2	0.7		9.5		30.8	20.5		9.1	46	17.2	2.3	9.1		41.3	43.0
9.5		51.9	30.0		9.3		41.9	48.6		8.9	13	8.4	9.5	A	9.2		22.8	47.1	9.3		42.5	19.0
9.2	35	20.6	30.3	B	9.5		54.0	3.0		8.2		34.3	13.5	A	8.6		33.4	23.4	A	9.5	15	3.9	9.2
9.0		35.2	52.8		8.5	52	13.3	19.6		8.9		41.3	35.7	A	8.8		40.0	44.1	9.3		11.8	35.7
9.4	36	32.2	57.6		9.5		27.4	54.2	B	9.2	14	35.7	46.8	B	9.5	47	12.3	50.2	9.5		37.4	52.9
9.5		43.3	5.4		9.5		34.2	43.3	A	9.5		44.3	6.5		9.4		18.4	14.6	7.0	16	31.8	51.7	A
9.5		45.0	52.8		9.5	53	10.4	42.2		9.2		54.4	41.8		9.2	48	5.3	25.4	8.8		54.2	3.8
9.4	37	35.5	7.4		9.5		14.0	2.9		9.2	15	53.3	4.5	A	9.5		45.0	33.2	9.0	17	11.3	52.4	A
8.4		41.8	16.0		9.0		44.5	48.1	A	9.0	16	17.4	53.9		8.3	49	16.8	12.6	L	9.0		21.2	53.8	A
8.5	38	9.1	42.5	A	9.5	54	3.8	19.2		9.5		46.2	55.8		8.6		19.6	52.0	9.4		34.7	43.0
9.3		29.2	57.7		9.5		20.7	29.9		9.5		52.7	3.6	B	9.0	50	18.6	56.3	B	9.5	18	36.4	45.5
9.4		42.0	43.3		9.1		56.2	21.0		6.2		57.5	5.8	A	6.5		36.9	56.8	L	9.5	19	1.7	4.7
9.4		48.2	47.3		7.9	55	8.7	27.3	A	6.8		59.9	15.2	A	9.3	51	23.8	10.0	9.3		59.5	40.5	A
9.2		49.5	8.0	A	9.3		9.3	42.5	A	9.5	18	53.2	40.6		9.3	52	7.8	35.8	8.4	20	1.3	53.4	A
9.4		56.8	33.2		8.5		22.2	22.6	A	9.0	19	24.6	6.9	A	9.1		29.7	4.7	B	9.2		42.4	47.8	A
9.5	39	32.2	13.1		8.8		24.8	15.1	A	9.5	20	39.6	12.0		9.4	53	45.0	30.8	9.5	22	5.2	50.4	
9.5		54.4	41.6		9.3	56	2.9	17.2		7.5		43.8	48.9	A	8.8		58.2	48.6	A	7.8		24.8	28.3	A
9.5	40	6.8	5.0		9.4		26.3	13.8		9.5	21	28.9	12.5		6.8	54	48.8	15.4	A	9.1		50.7	28.3	
9.5		13.9	12.1		9.2		54.5	12.7	A	9.3		37.5	52.9		9.5	55	8.7	22.3	9.5	23	30.9	2.8	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	6ᵘ		+48°		6ᵘ—7ᵘ		+48°		7ᵘ		+48°		7ᵘ—8ᵘ		+48°		8ᵘ		+48°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.4	23	36.2	58.6	9.5	48	52.0	17.7	8.2	14	57.5	58.3	A	9.1	40	22.8	49.8	9.5	16	1.6	1.5
7.8	24	13.8	3.8	A	9.5	49	29.1	9.9	7.7		59.4	49.6	B	9.5	41	31.7	14.0	8.2		22.0	57.1	B
8.9		56.7	30.2	9.4		33.1	45.2	8.7	15	3.0	48.1	A	9.3	42	23.6	52.1	8.8	17	28.0	33.4	A
8.3	25	58.0	13.1	A	8.7		42.5	39.9	A	9.4		14.6	3.9	A	8.8	43	45.8	49.8	A	9.1		59.0	20.1	A
9.5	26	11.0	37.4	B	8.4		46.5	22.1	A	9.5		27.5	0.0		7.8	44	37.2	31.6	A	8.7	18	3.1	13.6	A
8.0		56.3	36.7	A	9.0		51.9	8.4	A	9.1		28.9	29.0		9.5		51.0	2.2	8.5		13.3	10.7	A
9.3	27	16.4	54.6	9.5		59.0	39.3	9.5	16	3.3	31.4	9.1	46	5.5	57.9	A	9.5		15.1	38.0	
9.5		29.7	11.1	9.5	50	15.9	53.2	8.0		16.7	29.7	A	9.5		12.0	22.8	9.4		17.3	40.3	B
9.2	28	29.2	59.2	8.2		32.7	35.5	B	9.1		17.8	10.8		9.5		40.3	53.1	8.3		29.9	31.8	A
9.4		37.1	53.1	9.4	51	6.9	38.8	8.6		22.5	6.8	B	9.1	48	40.8	1.7	9.4	19	15.0	38.7	
8.2	29	50.2	21.4	A	9.5	52	38.4	37.0	9.5		36.7	10.4	9.5		46.2	26.7	8.0		52.7	48.5	A
9.0		51.1	18.0	A	8.0		39.1	6.4	A	9.0		46.1	6.9	A	8.0	49	23.7	11.0	A	9.0	20	39.6	28.9	A
9.0		57.3	37.2	9.4	53	51.9	41.8	9.5	17	6.3	55.0	9.3		26.8	21.8	9.4		51.0	5.0	
9.2		59.4	4.3	9.5	54	3.0	50.6	7.8		31.1	26.0	A	9.5	50	7.7	19.8	8.9		53.6	13.8	A
8.7	31	4.3	46.5	A	9.0		45.9	39.4	7.5		34.5	22.0	G	9.4	51	17.9	0.2	9.5	21	0.1	36.3	
9.4		29.9	19.9	9.4	56	3.4	15.2	9.0		47.0	40.7	A	9.2		36.8	26.7	A	9.0		15.0	23.3	B
9.0		51.8	36.5	A	9.5		43.8	15.7	7.2		57.7	12.7	G	7.0	52	7.3	59.6	A	9.0		42.5	51.9	
9.0	32	42.4	14.3	A	8.2		45.4	0.0	A	6.0	18	5.2	28.9	A	9.5		37.2	3.6	9.2		46.5	6.9	A
9.4		52.8	3.1	B	9.2		48.5	55.7	A	9.0		18.3	58.3	A	8.4		42.3	44.4	A	9.1		53.8	43.4	B
9.5		59.7	24.5	9.5	57	17.4	6.9	9.5		33.7	7.4	9.3		46.6	14.1	B	9.3	22	7.0	42.5	B
9.5	33	2.9	42.8	9.5		53.3	19.2	9.1	20	17.5	40.9	A	9.3	53	12.5	3.2	9.3		7.9	41.5	
9.2		33.9	23.1	9.5	58	10.5	44.6	9.5	21	10.8	54.7	8.9		12.8	39.9	A	9.5		45.4	46.1	
9.5		38.4	2.5	9.5	59	21.7	44.1	9.5	22	1.5	14.8	8.0		42.3	20.3	L	9.4	23	13.0	12.7	
9.5	34	0.5	43.3	8.0	0	14.5	9.8	A	9.5		14.4	38.4	9.2	54	8.6	10.4	B	9.0		16.2	23.0	
9.1		8.9	56.5	9.5		40.4	21.0	9.5		38.8	26.8	9.4		22.3	16.0	9.4	26	2.6	39.7	A
9.5		13.4	23.6	9.3	2	44.8	21.6	9.5		52.2	0.7	8.5		26.8	39.4	A	8.2		22.0	48.6	A
9.4		43.6	54.1	9.4		45.7	28.0	9.3		56.0	38.5	8.4		28.3	53.7	A	9.1		46.0	2.0	
9.5		55.9	46.6	9.0		48.0	45.7	A	7.0	23	52.2	30.0	L	8.1		32.0	18.3	A	9.5	28	22.1	9.8	
9.5	35	14.2	1.4	7.6		57.0	44.2	A	7.0	24	18.8	59.5	A	9.2	55	29.7	52.3	A	9.5	29	15.0	17.0	
9.5		18.5	6.2	9.5	3	40.8	11.2	9.0		33.1	54.1	A	9.0	56	49.8	6.6	9.3	30	35.1	32.8	
9.5		22.5	6.6	9.2		42.0	5.8	A	8.8		55.9	42.4	A	9.5	57	37.4	11.0	9.5		48.2	46.1	
9.2		32.0	52.6	9.3	5	3.8	54.4	B	9.5	25	13.3	2.7	7.4		39.8	34.6	B	9.0	31	22.0	12.1	
9.0		55.0	34.1	8.5		27.2	27.7	B	8.9	26	27.3	21.7	A	7.8	59	15.0	48.5	A	9.5	32	30.2	0.9	
8.2	36	26.7	21.8	B	9.3		30.7	49.4	9.5		34.2	43.0	9.5		46.0	37.3	9.0		37.6	40.0	B
9.5		28.8	32.5	9.3		55.8	14.1	7.4	27	33.7	5.1	A	9.5	0	28.6	42.2	7.6		42.5	42.6	A
5.5		36.9	55.5	A	9.5		56.0	30.8	9.5		35.6	57.5	8.7		30.0	32.9	A	9.5	34	39.0	33.5	
9.3		51.6	8.9	B	9.5		59.3	28.5	8.7	28	4.3	13.9	A	8.6		30.6	53.9	A	9.4	35	1.1	24.6	
8.0		59.4	9.7	A	9.5	6	1.8	53.5	9.3		36.5	37.0	A	9.1		43.5	37.3	A	9.5		58.4	42.4	
9.5	37	13.9	2.5	B	9.5		7.4	27.1	8.3		47.8	18.2	A	9.3	1	39.2	55.2	9.3	37	2.0	29.5	
9.5		16.7	48.2	7.8		24.3	43.1	A	8.7	30	19.9	46.9	9.5		59.5	27.7	9.5		16.0	15.2	
9.5		16.9	32.9	8.8		49.2	42.1	A	5.8		30.5	27.7	A	6.5	2	58.0	43.2	A	9.3		20.2	55.8	
9.5		18.1	13.2	9.0	7	10.5	9.9	9.3	31	49.3	27.6	9.4	3	14.6	23.6	9.5		59.1	21.0	
9.5		58.5	25.0	9.4		11.2	30.9	8.2		53.1	51.1	A	8.4		58.3	53.6	A	9.5	38	8.3	13.7	
8.9	38	25.0	33.6	9.0		17.6	45.6	A	9.0	32	43.8	46.4	8.8	6	22.2	51.2	A	9.4		35.0	32.5	
9.5	39	6.4	13.3	9.5		22.3	28.0	9.3	33	0.4	1.2	A	9.4	7	15.0	32.3	9.5		48.0	33.0	
9.4	40	8.9	13.3	9.2		39.2	29.5	9.5		2.2	32.1	9.5		40.8	59.6	9.5	40	8.7	12.5	
8.5	42	36.7	39.1	B	8.0		48.1	22.6	B	9.4	34	8.2	17.0	B	9.0		57.0	10.2	9.5		9.7	16.8	
9.0	43	2.5	43.7	9.4	8	1.2	0.5	9.5		13.3	34.0	8.8	8	36.6	7.3	A	9.5		26.7	16.6	B
9.0		11.6	18.2	9.2		7.0	26.9	A	7.3		21.2	44.4	A	8.9		52.0	33.4	A	9.2		37.2	32.0	
8.0	44	24.8	44.3	B	9.5	9	3.8	6.8	9.4	35	31.8	9.5	9.0	10	4.5	43.8	A	9.5		43.6	1.8	
9.3	45	8.2	14.7	9.4		3.9	32.5	B	9.3	37	5.2	27.6	9.5		16.1	58.4	9.4	41	36.4	6.5	
9.5		8.8	24.0	9.4		17.5	35.0	8.8		11.4	46.4	B	9.5		18.0	51.2	9.3		49.9	8.5	A
9.4		10.9	52.1	8.9		19.5	35.0	A	9.3		12.3	3.2	9.5		50.4	6.0	8.0	42	0.0	7.2	A
9.4	46	35.0	12.4	9.4		25.4	14.3	9.3		24.8	13.0	A	8.9	11	24.2	55.5	8.5		24.1	9.0	A
9.5		35.0	18.1	9.4	10	31.3	33.3	A	9.1		33.0	31.6	A	8.3		48.9	47.6	A	9.3	43	42.6	10.7	B
9.4		51.0	36.4	9.5		54.0	42.1	7.5		52.0	8.2	A	9.5	12	36.0	19.6	9.3		42.7	4.8	
7.8	47	1.9	40.8	A	9.2	11	45.9	11.8	A	9.5	38	6.3	29.1	8.0	13	0.1	32.4	A	9.4		51.2	18.0	
9.5		18.7	54.8	9.5		47.3	35.3	8.0		52.0	27.0	A	8.5		11.5	20.5	9.5	44	42.0	1.3	
9.4		29.3	50.8	B	9.5	13	53.0	3.9	9.2	39	11.3	17.4	A	7.5	14	40.0	13.2	A	9.5	45	3.6	59.4	
7.5	48	42.4	48.4	A	9.5	14	36.8	20.7	9.5		37.2	44.3	9.4	15	57.0	25.1	A	8.8	46	10.9	18.1	B

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	8ᵘ—9ᵘ				9ᵘ				9ᵘ—10ᵘ				10ᵘ—11ᵘ				11ᵘ		
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.2	46	11.8	11.7	9.5	13	39.6	46.8	9.3	48	18.6	18.9	A	8.9	30	5.1	29.5	A	9.4	17	42.4	42.7	B
9.5		13.3	51.8	9.5		39.8	6.5	7.7		43.3	55.1	A	9.3		52.4	42.0		9.3	18	1.0	42.4	
9.5	47	20.9	51.8	9.0	14	28.0	33.9	9.0	49	39.2	26.8		8.0		52.6	32.5	A	9.5	19	29.5	53.3	
9.5	48	15.0	45.2	9.5		52.5	52.3	9.5		52.4	19.4		9.5		57.8	58.9		8.0	20	14.4	15.3	B
8.0		23.6	36.0	A	9.5	15	1.4	16.5	8.0	50	22.6	37.8	A	9.5	32	9.7	6.9	B	9.5		45.5	37.2	
9.3		40.1	43.7	B	9.3		15.6	22.4	9.0	51	17.2	57.1	A	8.3	33	48.4	45.0	A	8.8	21	57.6	5.1	B
3.1	49	16.3	35.9	A	9.5		47.4	7.5	B	9.5		41.1	3.9		9.3		59.4	56.8		9.5	22	11.2	49.0	
7.9		19.3	49.6	B	9.5	16	9.4	54.2		8.9	52	53.3	5.4		9.5	34	43.4	13.6		9.4		21.5	14.3	
9.5	50	22.5	33.9		8.9		41.3	8.0		9.5	53	11.8	52.3		7.8		59.2	58.3	A	8.2		23.0	3.3	A
9.5	51	36.3	7.5		8.4		42.5	18.0	A	9.3		37.5	10.9		9.4	36	9.9	2.1		9.4		41.6	43.6	A
9.4	52	15.5	42.2		9.3	17	7.0	10.1	A	9.5	54	48.4	4.9		9.5	37	4.4	21.5		9.5		52.9	38.2	
9.0	53	3.0	43.5	A	9.1		14.6	13.5		9.5	55	0.6	28.3		9.0		13.5	37.0	A	6.5	23	1.4	44.1	A
8.8		8.5	9.1	A	7.5		19.5	23.9	A	9.5	56	29.5	53.0		9.3	39	34.4	31.0		9.2	24	33.2	26.2	
9.0		9.0	35.4	A	9.5	19	18.2	3.1		9.4	57	32.8	54.0		9.5	42	51.9	57.4		9.0	25	41.0	16.8	
9.3		14.0	7.3	B	9.2	20	12.0	13.5		9.5		53.5	4.4		9.5	43	27.4	48.5		9.2	26	1.5	36.1	
8.0		16.6	14.5	A	8.0		56.6	29.5	G	9.0	58	44.9	40.3		9.5	44	2.8	25.1		9.5		13.6	21.2	
9.5	54	29.0	9.5		9.5		57.2	53.6		9.0	59	3.1	26.3	A	7.3	45	24.9	27.0	A	9.5		58.8	7.1	
9.5		52.8	23.5		9.4	22	3.0	5.0	A	9.5		51.3	52.4		8.5		59.9	15.1	A	9.5	29	26.3	15.3	
9.5		58.4	43.3		7.6		53.2	57.2	G	9.5	0	9.9	22.2		9.5	46	45.8	47.9		9.5	31	3.5	20.7	
9.5	55	19.6	42.9		7.3		57.5	47.9	A	9.5		17.4	13.8		8.2	47	40.5	48.2	A	9.5	33	51.1	18.8	
9.4	56	4.0	43.4		9.5	23	16.3	27.9		9.5	1	24.2	47.1		9.0		42.1	47.3	A	9.5	34	27.0	24.2	
9.0		31.0	40.4		9.0		21.5	14.5		9.5	2	0.9	11.9		9.0	48	30.0	10.6		9.5	35	16.5	24.2	
9.5		31.0	53.8		9.1		44.5	15.5		9.1		6.3	45.2		9.5		45.5	14.1		9.4	36	12.2	5.3	
9.5	57	23.7	40.9		9.4	25	11.6	13.6	B	9.5		19.5	57.1		9.3	49	7.9	39.5		7.8	37	59.0	28.2	A
8.8		32.2	15.5		8.7		15.7	55.5		8.8		54.3	33.0		7.5		12.4	31.5	A	9.5	38	15.2	21.2	
9.0		32.8	7.0		9.5	26	16.0	38.9		9.5	3	32.9	26.0		9.3		35.6	59.8	B	4.0		24.6	34.2	A
9.2		50.4	51.8		8.9		34.0	11.0	A	7.5	6	30.0	4.7	A	9.5	50	8.0	59.7		9.5	39	8.4	42.1	
9.5		57.0	11.5		8.3	28	11.5	39.3	A	9.5		34.4	22.5		7.8	52	40.6	38.1	A	9.5		29.8	35.2	
8.9	59	52.0	44.3	A	7.7		28.7	13.0	A	8.9		36.9	2.1	A	7.2		41.3	28.0	A	9.5		58.3	57.5	
9.5	0	43.7	47.4		9.3	29	10.5	26.0		7.5	7	59.0	2.1	A	8.4	53	11.0	48.4		9.4	41	28.9	25.7	
9.5		49.0	52.8		9.3	30	14.5	26.5		9.5	8	28.6	53.9		8.9		59.8	37.9		8.8		37.0	35.6	
9.5	2	14.5	37.9		9.2	31	11.3	12.5		9.5		31.1	31.0		8.8	54	11.7	55.9		9.2	42	35.5	28.4	
8.8		25.1	53.6	A	9.1	32	19.6	4.1	A	9.5		59.9	16.1		9.4	55	31.3	24.5	A	9.5	43	22.0	52.3	
9.5		35.3	55.8		9.2		35.0	1.5	B	9.5	9	1.2	21.1		9.5	56	23.0	23.9		9.5		28.8	7.8	
8.7	3	26.9	59.2	A	9.3		55.1	30.9		9.3		12.0	21.1		9.0	57	27.2	50.7	A	9.2		53.7	17.8	
9.5		38.0	55.3		8.9	33	5.7	8.1	A	9.1		24.4	17.1	A	9.0	58	30.2	12.1	A	9.5	44	2.1	0.8	
9.1		50.2	40.7	B	9.5		53.3	7.6		9.5	11	9.0	27.0		9.5	0	7.8	27.2		9.5		13.8	33.2	
9.2		57.7	3.5	A	9.3	35	4.9	38.9	B	9.3	12	23.1	59.1		9.1	1	23.7	33.6		8.6		24.7	53.3	A
9.2	4	7.0	42.4	A	9.0		32.5	22.5		8.5		27.9	35.5		7.1	2	12.1	34.9	B	8.0	45	12.5	21.2	
9.1		7.0	49.2		9.3	36	9.0	3.6		7.5		45.2	46.9	F	9.2	3	1.9	59.3		9.5		14.5	30.5	B
9.5		8.9	40.7		9.0		10.8	43.9		9.5	13	21.0	31.0		9.2		25.8	48.5		9.5	46	4.0	12.8	
9.5		16.6	18.5		9.5		44.6	45.5	B	8.9	14	30.1	20.5	A	9.0	5	31.4	52.3	A	9.5		4.8	39.7	
9.5		21.5	41.0	B	9.5		53.9	50.3		9.5	15	11.6	48.2		9.3	6	22.8	6.3		9.0		24.7	17.9	
7.8	5	46.4	49.4	A	9.5		56.6	27.5		8.0	16	42.1	17.6	A	9.5	7	4.3	42.6		9.5	47	2.3	0.6	
9.2	6	1.0	7.6	A	8.3	37	47.4	42.1	B	9.5	17	33.4	14.6		7.0		17.7	16.7	A	8.6	48	4.8	3.9	B
8.5		11.5	18.0	A	9.5	38	30.8	14.0		8.3		45.4	49.4	A	8.8		26.0	52.6	A	8.2	49	27.2	36.1	A
9.5		31.9	2.4		8.9	39	40.7	19.2	A	9.5	19	28.4	20.6		9.3		39.8	54.2	B	8.1		57.5	35.2	A
9.2	7	8.5	22.5		9.2		48.4	22.8		9.0		36.9	15.6		7.5	9	10.2	43.6	A	8.8	50	32.8	51.7	A
8.2		28.9	56.2	A	9.5	40	0.0	27.8		9.2	20	42.2	6.1		9.5		33.0	22.7		7.2	51	5.1	34.2	A
9.5	9	10.0	58.4		9.5		9.5	40.3	B	9.5	21	10.0	27.5		9.5		35.5	2.8		9.0		39.6	48.1	
8.3		58.6	42.3		9.0	41	59.9	53.2		9.5	22	50.5	19.6		9.5	10	55.2	25.7		9.5	52	20.3	5.3	
9.3	10	14.5	24.0		9.5	42	42.0	22.3		9.0	23	19.2	7.1	A	8.6	11	22.5	14.8	A	8.6	54	16.7	16.3	
9.5	11	28.0	21.9		8.7	43	10.0	52.8		8.8		38.4	16.6	A	9.5		33.9	19.3	B	9.4	55	22.6	26.5	
9.5		34.6	28.9		9.5		50.7	28.8		9.5		40.3	30.5		9.1	12	38.3	44.0		9.1		50.9	39.0	B
9.4		48.8	57.8		9.2		57.2	53.5		9.1	24	45.9	49.5		9.3	13	15.0	33.6	A	8.7		56.3	53.0	A
9.3	12	5.0	26.0		9.5	43	4.8	49.2		9.5	26	59.1	14.6		9.5		35.1	52.0		8.3	57	42.6	12.3	A
9.2		46.5	9.0		9.0		18.1	41.2		7.8	27	23.0	31.0	A	9.5		41.3	3.8		9.0	58	0.9	53.6	
9.3		47.7	0.7	B	9.5	46	4.4	17.4		8.9		50.4	15.1	A	9.4		52.4	15.2		9.2		28.9	56.6	
9.5	13	23.2	18.0		9.5	47	2.5	55.6		8.3	28	3.4	28.5	A	9.5	15	21.3	41.8		9.0		39.3	4.8	
9.5		23.2	47.9		8.5		31.9	10.4	A	9.1		33.6	17.1	A	9.5	17	37.0	34.7		7.8	59	32.7	41.9	A

2061—2120				2121—2180				2181—2240				2241—2300			
	12ᵘ—13ᵘ	+48°			13ᵘ—14ᵘ	+48°			14ᵘ	+48°			14ᵘ—15ᵘ	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.3	46 21.8	27.1	A	8.8	21 52.0	56.7		8.3	8 23.4	23.5		9.5	43 2.6	0.5	
9.2	29.6	16.6	A	6.8	22 56.3	35.6	A	8.7	27.1	55.5	B	9.5	4.1	42.9	
9.4	41.9	7.7		9.5	23 51.8	1.2		9.3	9 15.8	27.2	B	9.0	44 15.6	50.9	
9.4	47 40.5	58.3		8.8	24 43.3	44.5	A	9.4	27.6	14.5		8.6	47 16.0	24.0	
9.5	50.2	25.6		9.0	56.8	27.1	A	8.1	32.6	36.9	A	8.9	49 39.5	32.0	A
9.0	49 36.2	8.7		9.2	26 40.3	30.1		9.5	10 22.7	23.5		9.5	50 45.4	50.2	
9.5	50 0.5	14.3		7.8	27 9.8	30.1	G	9.5	57.4	46.1	B	9.4	47.7	52.7	
9.5	57.9	52.0		8.8	23.7	55.3	A	6.6	12 24.9	40.5	B	8.3	51 14.0	40.4	R
9.0	51 3.2	15.1		9.2	43.3	45.5	A	9.1	56.6	57.8		9.3	52 11.4	43.0	
9.1	52 4.7	13.2		9.1	50.9	43.5	A	8.8	13 6.1	34.8	A	7.5	14.8	58.7	A
9.5	11.2	57.1	B	9.0	29 4.2	28.6		9.5	49.0	20.0		9.0	24.9	39.5	A
9.1	53 29.0	13.3	A	9.1	35.2	16.3	A	9.0	15 43.1	13.6	A	8.2	53 14.4	37.0	A
9.5	54 11.5	59.3		9.4	39.4	41.5	A	8.8	17 58.6	15.8	A	9.3	54 31.5	43.4	
9.5	35.2	12.2		9.3	30 6.2	55.9		9.3	59.7	30.5		9.4	55 48.5	5.9	B
9.2	55 3.8	28.6	A	9.5	44.8	32.6		9.5	18 32.3	17.5		9.5	56 59.3	50.5	
9.4	23.5	53.5		9.2	31 48.0	58.9		9.1	19 7.1	11.1	A	9.0	57 1.6	30.1	
9.5	38.9	55.8		8.6	51.4	47.0	A	9.3	11.8	32.9	B	8.4	35.7	19.6	R
9.0	56 37.5	46.5		9.2	56.9	52.5	A	9.4	16.0	59.2		8.5	58 6.6	18.1	R
8.0	46.3	45.0	G	9.3	32 39.2	36.0		7.5	20.6	29.4	A	4.5	59 1.3	13.2	A
9.1	49.7	31.1	A	8.5	33 6.8	3.7	A	9.1	28.1	30.5	A	9.5	22.1	42.0	
9.5	57 11.5	25.1		7.7	16.0	39.0	A	9.5	21 1.1	56.8		9.5	0 23.6	59.1	
9.5	23.1	7.1	B	9.3	32.3	3.2		8.0	33.1	39.8	A	5.5	38.5	43.5	A
8.8	58 0.0	53.9	A	9.5	50.2	22.1		9.1	52.6	33.4	A	9.4	1 33.1	56.1	
7.2	59 18.0	33.6	A	9.4	34 31.6	41.5		9.5	22 10.2	1.1		9.4	59.4	11.2	A
9.3	25.2	37.5		8.1	32.5	12.4	B	9.5	45.1	30.0		9.5	2 4.8	40.5	
7.8	35.0	49.5	A	8.9	59.4	55.3		9.1	23 34.5	21.7	B	9.1	4 35.6	10.2	A
9.3	55.8	23.1		7.7	35 54.8	10.2	A	7.5	59.2	38.9	A	8.4	5 47.1	32.6	A
9.5	0 46.3	20.2		9.5	38 18.8	38.5		9.5	24 41.3	20.0		9.4	6 4.2	10.2	
9.4	1 5.2	20.2		9.5	51.3	14.7		9.2	46.1	16.0	A	9.5	7 53.2	52.5	
9.4	9.4	10.8	B	9.5	53.9	12.7		9.3	47.6	0.1		8.9	55.4	40.0	A
9.5	11.4	42.3		8.3	40 26.3	47.1	A	9.4	53.4	6.4	B	7.8	9 7.4	2.6	B
9.2	11.9	17.2		7.8	41 19.9	27.6	A	9.5	25 2.8	0.5		9.3	8.1	17.1	
9.4	2 34.0	51.0		9.5	43 32.7	58.4	B	9.5	7.1	40.4		7.3	14.2	30.1	A
9.3	4 19.8	59.3		9.5	35.8	19.5		9.5	46.3	51.3		9.5	26.0	40.5	
8.9	5 48.5	31.6		9.1	44 21.6	32.9	A	9.5	56.2	46.4		9.1	11 29.1	34.0	A
8.8	50.7	20.6	A	9.3	45 27.1	4.5		9.5	26 38.6	9.6		8.9	50.2	39.0	A
8.6	6 26.8	5.7	A	9.3	46 17.2	4.5		9.0	27 18.6	51.0	B	8.1	55.9	9.2	
8.6	7 11.2	34.6		9.5	47 8.2	27.5		9.1	28 3.1	20.0		9.5	12 49.2	36.0	
9.3	10 44.3	37.0		7.0	48 13.2	34.9	A	9.0	49.6	21.0	A	7.5	55.8	17.1	A
9.1	48.0	27.0	A	9.3	49 14.1	28.0		8.8	30 51.1	19.5	A	9.5	13 42.1	29.6	
9.1	11 3.8	47.0		9.5	28.3	13.0		9.2	31 34.1	10.0		9.4	42.3	15.2	B
8.8	8.7	57.0	A	9.5	43.9	9.5		7.6	46.3	50.6	A	9.5	15 56.0	59.7	
9.2	33.9	18.7		9.4	51 32.0	43.8		8.9	52.6	6.6	A	9.2	16 16.3	53.4	
9.1	36.2	0.3		9.5	52 33.5	5.5		9.2	32 19.2	20.9	B	9.0	27.5	45.5	
9.3	54.5	30.3	B	9.2	34.6	56.5	A	9.1	26.4	20.3	A	9.5	44.1	50.5	
9.5	12 24.3	14.5		9.3	53 12.0	40.4		9.2	34 17.0	58.2	A	8.5	17 3.6	10.2	A
9.4	29.8	49.5		9.0	40.6	47.9		9.5	23.2	33.9		9.3	37.7	31.6	
8.5	13 28.8	32.6	A	9.2	55.6	33.5	A	9.4	35 11.9	6.4	B	9.5	49.2	42.5	
9.5	14 13.7	40.5		9.2	54 40.2	6.5	B	9.5	29.1	41.9		9.2	18 29.1	33.0	
9.4	16.2	37.0		9.5	48.0	5.4		9.5	36 51.6	17.5		9.2	56.1	6.7	
6.5	51.5	2.7	A	9.3	58.5	45.1	B	8.3	38 44.1	20.0	A	9.3	19 10.0	46.4	
9.3	15 29.2	50.6		8.5	55 1.6	40.8	A	8.7	52.9	59.1	A	9.3	45.1	43.4	B
9.2	18 20.0	36.6	B	8.2	8.2	43.3	A	8.9	39 4.6	55.3	B	9.5	20 19.6	52.7	
9.3	23.5	19.1		9.0	49.6	52.9	A	9.4	14.1	51.1		8.8	21.6	34.0	A
9.1	19 40.8	44.5	A	9.1	0 20.1	37.4		9.3	57.1	34.0	A	9.4	21 21.8	24.1	
9.0	20 26.6	9.7	A	9.0	1 43.6	50.9	A	8.2	57.4	49.8	A	9.5	22 57.1	24.1	
8.3	21 6.3	44.0	A	6.7	2 26.6	53.9	A	9.0	40 0.8	28.8	B	8.5	57.1	0.7	
9.1	8.2	52.0		8.9	3 40.1	39.9	A	8.5	8.7	26.3	B	9.4	24 14.2	19.1	
8.0	37.8	31.6	A	9.3	7 44.1	51.8		9.4	53.2	26.5		8.8	26.7	1.2	
9.5	42.3	6.2		9.3	8 20.3	45.5		7.4	42 20.8	31.0	B	6.7	47.3	13.6	A

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	15h—16u	+48°			16u	+48°			16u—17u	+48°			17u	+48°			17u	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	24 49.0	54.3		8.5	1 13.6	47.5		8.0	34 54.6	54.1		6.5	3 30.4	35.5	A	7.5	32 45.7	33.5	A
9.4	25 2.0	51.5		9.5	36.4	1.8		9.4	35 24.9	19.3		9.0	44.5	1.0		6.0	52.2	41.4	A
9.0	23.2	48.5		9.4	3 3.5	56.8	B	9.3	33.4	14.8		9.5	4 38.5	23.1		9.1	33 17.0	19.0	
9.3	41.4	42.0	B	9.5	4 46.9	7.4		9.4	50.3	30.3		8.8	40.3	46.5	A	8.9	43.5	50.8	A
9.1	26 23.6	56.0	A	9.0	5 26.4	41.7		8.4	36 50.8	15.9		9.2	5 2.4	38.1	A	9.5	54.9	0.8	
9.0	27 40.3	26.1		9.5	50.1	3.8		9.5	37 34.9	18.8		9.5	6 10.2	45.0		9.5	55.4	9.3	
9.3	28 30.5	18.1		9.0	58.9	42.7		9.3	38.8	11.4		8.9	7 3.8	32.5		9.5	34 48.2	56.9	
9.5	38.2	55.4		9.4	6 0.1	7.3	B	9.2	38 23.7	44.8		9.1	38.8	46.0		8.5	58.3	46.9	A
9.5	29 50.6	50.0		7.0	16.8	10.9	A	8.1	40.9	40.2		8.5	40.0	56.9	A	7.8	35 21.7	31.5	A
9.4	30 24.7	7.2		8.0	7 16.3	7.9	A	8.2	41.2	45.8	B	9.3	8 2.8	11.2		9.5	39.7	51.9	
9.3	31 2.9	2.4		9.0	35.6	38.7	A	9.5	49.3	29.8		9.1	19.2	5.9		9.5	48.0	22.5	
8.8	32.8	24.2	B	9.5	8 22.4	1.4		9.3	39 47.8	15.8		9.5	24.0	32.0		9.3	57.9	45.9	A
9.4	55.2	0.3	B	9.4	41.8	32.3		7.0	40 37.4	31.3	A	9.5	40.9	49.0		9.5	36 44.4	39.5	
8.0	34 8.3	56.0	A	8.3	53.1	26.8	A	9.5	42.3	40.7		9.5	43.5	4.9		9.5	58.7	26.6	
9.5	51.4	13.7		9.0	54.6	40.2	A	8.0	41 43.2	27.8	A	9.5	10 4.7	4.2		9.5	37 36.1	19.0	
9.4	35 48.6	58.8		9.5	9 35.3	52.6		9.1	42 29.0	13.9		9.5	11 54.2	34.5		8.9	41.4	37.0	
7.5	53.5	32.1	A	9.1	35.5	10.4		9.1	43 54.4	49.2		9.3	12 56.2	13.0	B	8.3	38 34.0	32.0	A
9.0	36 13.1	19.6		8.0	10 26.8	14.4	A	8.9	44 1.4	16.4		8.9	13 10.3	1.7		9.4	47.8	40.0	
9.3	37 32.7	46.5		9.2	11 2.3	52.6		7.8	40.9	1.9	A	9.1	46.2	8.1		9.5	39 40.9	55.4	
9.3	38 4.6	47.0		8.4	5.7	39.7	A	9.0	43.3	22.3		9.4	57.0	34.4	B	8.8	45.1	7.3	A
9.3	52.1	35.6		8.0	15.1	17.8	A	9.1	51.2	39.2		9.3	15 25.3	8.7		8.8	40 53.2	35.6	
8.0	57.1	15.1	A	9.4	31.8	1.7	B	7.0	45 7.3	28.8	L	9.1	28.2	12.8	B	9.5	41 2.5	25.9	
9.5	40 25.1	30.1		9.5	48.4	54.9		9.5	46 12.5	22.3		9.5	32.5	31.6		8.5	9.7	50.0	
8.7	34.7	27.7	B	9.5	57.3	19.3		8.3	37.4	56.9		9.0	16 5.2	30.1		8.7	16.8	36.5	
9.3	57.6	0.4	B	9.5	12 27.9	24.3		7.3	53.9	34.6	A	9.0	8.4	38.0		9.3	22.5	35.7	
8.9	41 21.9	21.6	A	9.3	36.8	57.1		9.0	47 44.9	43.3		6.5	38.2	20.5	L	9.4	42 7.6	12.2	
9.5	50.6	23.1		9.5	55.3	49.2		8.5	50.2	32.8		9.0	53.0	10.6		9.5	48.4	9.7	
9.5	42 25.1	3.7		9.4	14 19.4	49.2		8.5	48 0.3	29.4	A	9.5	17 48.2	21.0		9.4	57.9	58.7	B
8.9	43 17.4	4.2		9.3	16 9.4	36.2		9.1	49 10.9	46.7		9.5	18 13.5	51.5		9.5	43 15.7	11.6	
8.0	18.1	21.1	A	9.0	50.3	7.1	B	9.2	43.8	12.9		9.5	40.5	5.8		8.8	52.2	1.3	
9.5	51.9	12.7		8.8	17 25.5	19.3		9.5	50 2.8	24.3		9.4	41.9	0.3	B	9.0	44 24.2	17.4	B
9.2	44 36.8	55.4		9.4	35.3	4.6		8.9	51 34.9	46.2		8.3	19 41.8	49.4		9.1	38.3	38.0	
9.5	46 2.5	19.7		9.5	18 19.5	36.8		9.0	39.8	50.2		9.3	44.0	39.5		8.5	44.9	54.1	A
7.5	27.1	55.4	A	9.5	21.1	29.8		9.5	57.6	14.2		9.0	44.6	15.4	B	9.2	45.0	18.4	
9.1	41.3	40.5		9.5	57.9	50.2		9.1	52 28.8	31.2		9.4	21 59.5	12.6		9.4	49.2	13.1	
9.5	47 9.1	30.1		8.4	19 24.9	22.3	A	9.3	53 4.0	38.5	B	8.8	22 17.7	25.0		7.3	45 3.3	52.1	A
9.5	10.2	39.5		9.3	20 51.2	58.5		8.4	7.9	22.8		6.0	53.2	24.0	A	8.8	10.4	46.0	A
9.5	48 17.6	24.6		8.4	21 1.9	33.3	A	9.3	45.5	22.3		8.7	23 1.7	20.0	R	9.5	43.1	31.0	A
9.5	23.1	36.5		8.9	47.3	40.2	A	8.1	52.0	14.5	A	9.5	14.1	1.9		9.2	46 0.2	42.5	A
9.5	41.4	56.6		6.5	22 25.4	16.8	G	9.3	59.7	2.7		9.1	24 5.4	0.8		9.5	11.2	7.7	
9.4	51.3	29.6		8.4	45.9	50.4	A	9.0	54 25.2	6.5	B	9.5	35.7	29.0		6.5	16.7	27.0	G
8.9	50 5.7	33.5		9.4	52.1	54.2	B	8.0	29.3	12.4	A	9.5	37.7	2.9		9.5	37.1	51.5	B
9.1	30.0	26.6		9.5	23 55.9	57.2		9.0	55 14.9	36.2		9.3	58.8	22.5		9.5	38.1	52.7	
9.5	51 30.7	50.5		9.5	24 29.8	38.2		9.4	32.8	15.5		9.5	59.2	18.6		8.5	47 1.2	25.1	G
9.3	52 11.6	19.6		8.4	51.9	46.7		9.4	56 3.6	14.5	B	7.5	26 16.3	15.1	A	9.2	37.7	1.6	
8.0	53 36.1	6.7	A	8.4	52.4	32.3		8.8	12.9	32.3		9.5	26.7	56.4		9.5	46.8	35.5	
9.0	54 3.8	54.6		6.8	26 9.8	15.4	A	8.0	17.7	55.0	A	9.1	58.8	45.9		8.2	48 12.5	14.8	B
8.8	5.6	1.2		8.5	18.1	6.4	A	9.3	36.9	29.8		8.8	27 13.2	26.5		9.3	17.7	43.3	
8.8	56 24.0	44.0	A	9.2	27 2.9	59.2	A	9.0	57 20.1	50.7	A	9.4	20.1	6.3		8.5	32.8	39.9	A
9.5	31.9	15.7		9.5	29 23.0	56.9		9.0	58 58.6	36.3	A	9.5	39.3	39.5		9.3	49 5.2	12.1	
9.2	44.7	27.7		8.5	34.3	11.4	A	9.5	59 14.9	45.7		9.3	28 37.0	51.9		9.2	6.2	17.1	
8.2	58.6	58.7	A	9.5	30 55.8	4.4		9.4	0 2.8	36.8	B	7.3	57.7	0.3	A	8.6	15.3	30.5	
9.0	57 49.2	32.0		7.5	31 5.9	42.2	A	9.3	3.9	20.3		9.3	59.5	0.8	A	9.4	23.4	55.4	
8.7	58 26.4	18.2	A	9.3	37.0	9.4		8.3	25.1	11.6	B	9.0	30 14.4	14.3	B	9.5	30.7	28.0	
7.8	31.4	45.4	A	9.1	32 59.2	1.7	B	9.0	56.7	49.7	A	9.1	40.2	21.0		9.3	42.1	33.3	B
9.5	34.1	52.5		9.0	33 18.0	1.5	B	8.6	56.9	17.2	B	9.1	42.9	5.4		8.0	50 9.0	33.0	J
9.3	0 4.3	53.0		9.2	29.4	40.2		9.4	58.3	12.2		8.6	31 5.1	9.3		9.2	34.9	9.7	
9.5	26.4	56.5		9.2	34 1.4	48.1	B	9.1	2 8.4	19.9	B	8.8	52.5	56.4		9.5	49.2	53.9	
9.3	1 5.3	43.5		9.4	43.8	2.9		8.5	3 3.2	36.3	A	8.6	32 3.9	17.7	B	9.3	51 14.7	9.9	
8.5	11.6	3.2		8.8	51.0	32.8		9.2	15.6	43.2		9.4	16.9	24.5		8.5	26.1	2.3	R

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	17ʰ—18ʰ		+48°		18ʰ		+48°		18ʰ		+48°		18ʰ—19ʰ		+48°		19ʰ		+48°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.5	52	4.5	17.1	9.5	9	50.9	4.4	9.3	30	19.4	20.5	9.1	48	35.3	13.3	9.5	5	50.8	18.4
7.8		57.2	39.0 S	9.5		55.0	14.0	8.4		31.3	31.0	9.0		39.5	32.4	9.5	6	10.6	34.8
9.5	53	10.7	13.6	9.5	10	20.8	4.1	9.3	31	5.8	21.0	8.5		46.5	55.8 A	8.9		26.9	56.1
9.5		11.4	25.0	9.3		27.3	59.6	9.5		7.1	31.9	8.9		47.8	49.4	7.0		30.8	11.5 G
7.3		43.2	19.0 A	9.5		27.6	8.1	9.3		13.3	26.0	9.5	49	35.9	44.4	8.8		36.3	37.8
8.6		44.9	54.1	9.4	11	40.8	30.5	8.2		23.6	59.2 A	8.5		53.4	0.7	8.8	7	31.6	52.8
9.5	54	5.7	6.7	9.5	12	2.9	14.0	9.2		35.2	31.0	9.3		56.1	20.5	8.9		33.7	55.8
9.1		29.2	37.9 B	6.9		36.8	19.0 L	8.3	32	15.3	53.6 A	9.5	50	26.1	40.9	8.9		44.0	15.9 R
9.4		48.9	36.9	6.7		48.0	4.7 A	9.4		43.9	50.4	9.3		36.4	27.5	9.1		58.4	9.0
8.8		52.9	8.6 A	8.8		49.3	49.4 A	7.5		46.6	43.7 A	9.3		37.0	25.0	9.5	8	28.9	3.0
9.3		56.1	43.6	9.5	13	1.9	32.5	9.4		53.1	15.0	9.3		51.8	19.0	8.8		46.0	59.1
9.5	55	8.0	11.1	9.1		15.8	58.5	9.5		54.3	22.0	9.4		54.6	12.5	8.5		47.2	27.4
9.5		37.1	53.2	9.5	14	8.8	0.0 R	8.0	33	12.4	55.9 A	8.5		58.5	40.9 A	8.5	9	15.4	54.5
8.3		42.2	18.1 A	9.4		19.3	31.9	8.6	34	49.3	52.5 A	8.8	51	24.2	32.9	9.0		35.2	24.3 B
9.5		53.6	55.4	9.0		21.0	35.9	8.7		53.6	57.5 A	9.1		43.7	30.9	9.4		43.6	44.2
9.1	56	21.5	35.0	7.2	15	13.3	30.9 A	9.5	35	16.3	37.9	9.0	52	8.7	19.0 B	9.5		51.3	25.3
9.4		31.4	26.0	8.3		33.9	14.5 A	9.5	36	6.1	44.9	9.5		37.9	27.9	7.3		55.7	6.6 A
7.8		47.9	24.5 A	9.5		40.1	33.9	8.8		12.9	54.5 A	9.3	53	1.6	30.8	7.0	10	30.1	27.4 A
9.2	57	2.2	17.6 B	9.5		42.3	24.0	9.4		18.5	21.7	9.4		58.0	44.7	9.5		43.8	58.3
8.1		10.7	58.9 B	9.5		50.4	14.5	8.8		32.0	56.2 A	9.4	54	20.4	46.2	9.5	11	12.4	36.3
6.8		17.2	29.0 A	8.0		59.5	2.2 A	9.4		32.0	22.0	9.5		28.2	54.8	9.5		17.2	28.4
9.0		37.4	13.6 A	9.0	16	7.5	30.2 R	9.3		34.3	26.3	9.3		46.1	54.8	9.5		45.8	40.8
9.4		44.6	12.4	7.9	18	18.3	16.5 A	9.0		43.9	56.5	9.4		58.2	27.4	9.5		48.1	47.3
9.5	58	48.4	47.5	9.5		50.4	10.0	9.1		49.0	54.8	9.5	55	0.2	44.8	9.5		49.9	14.4
8.0		49.2	17.6 A	8.5		55.5	47.9	9.1	37	3.0	7.6	9.0		7.7	26.4	8.2		56.8	56.8 A
9.0	59	15.9	15.1 A	8.5		58.3	35.0	9.5		9.6	39.4	8.8		13.6	13.4 R	8.8	12	3.0	29.8 A
6.2		22.7	29.0 A	9.3	19	31.3	14.0	9.5		51.1	15.5	9.5	56	14.6	57.6	9.5		29.5	14.4
9.3		29.4	10.6	9.3	20	2.8	42.4	9.3		54.2	36.4	9.5		28.9	22.7	7.2		32.6	7.0 G
9.4		42.7	28.0	8.8		30.3	56.3 A	9.4	38	0.2	0.4 B	9.4		30.8	20.0	8.5		53.5	52.2 A
8.8		43.0	19.1 A	9.5		49.9	19.0	9.5		54.2	3.2	8.5		31.8	55.5 F	8.5	13	17.5	9.0 J
8.8		53.2	1.9	7.2	21	31.9	10.5	8.8	39	36.1	48.9 A	9.2	57	0.3	12.0	8.0	14	25.7	16.9
9.5	0	25.9	19.0	7.0		32.6	40.9 A	9.2		47.0	17.5	9.3		1.8	53.1 B	9.5		36.7	43.8
9.3		31.0	46.0 B	8.8	22	51.3	23.5 R	9.3		52.3	8.2	9.5		7.7	37.7	8.9		58.4	40.4
8.8		57.0	13.5 A	8.9	23	0.8	14.0	9.3		55.5	11.2	9.5		12.8	30.4	9.1	15	17.1	57.2 A
7.7		7.3	8.3 A	9.5		14.9	15.0	9.1	40	8.1	5.6	9.4		20.1	49.9	7.6		31.7	42.1 B
8.7		20.5	9.3 A	9.5		51.8	10.8	9.1		11.8	2.9	9.5		58.0	8.0	8.1		42.7	55.9 A
9.5	2	12.7	41.0	9.5		52.2	51.3	9.5		38.4	56.9	9.3	58	13.4	47.9	9.4		49.4	13.5
7.3		34.9	49.9 A	9.5	24	58.3	30.0	9.3	41	52.1	26.0	9.0		25.2	31.8	9.4		51.0	29.5
7.9		42.0	35.0 A	9.5	25	3.5	7.1 B	9.2		53.3	14.1	8.9		26.0	36.3 A	9.5	16	39.8	30.4
9.4		44.1	8.7	9.5		12.6	7.0 R	9.3	42	10.3	22.1	9.5		54.7	36.8	9.4		45.8	29.7
9.3		57.8	16.6	9.2		14.5	6.9 B	9.3		12.6	18.8	9.4	59	12.4	4.5	9.0		59.5	52.9
9.0	3	18.1	56.7 A	9.5		33.3	34.4	9.5		24.7	59.3	8.8		24.8	16.4 A	9.5	17	28.4	12.5
9.0	4	35.5	50.9	9.5		51.4	44.9	9.5	43	21.6	1.6	9.3		28.2	32.9	9.5		39.9	10.5
9.0		54.0	30.6	8.5	26	23.0	31.0 A	9.0		36.4	32.9	9.4		29.7	55.7	9.5		52.5	16.7
9.3	5	40.7	27.1 R	9.1		24.9	11.8	9.0		36.5	46.4 B	7.5	0	12.7	39.8 A	9.2		53.6	44.5
9.5		50.1	53.9	7.7		44.1	11.9 A	9.1		53.4	27.5	8.3	1	13.2	53.1 A	9.5	18	5.2	56.4
9.3		57.2	0.2	9.5	27	7.3	53.3	6.3		53.5	54.9 L	8.8		39.4	12.0 R	8.8		20.7	25.5
9.5	6	6.6	47.7 B	8.8		45.0	6.4	8.5	44	7.4	22.0	9.4	2	4.0	41.8	9.5		35.0	42.9
7.3		7.2	22.1 S	8.4		46.7	0.4 A	9.5		15.3	56.8	8.3		36.9	9.9	9.0		46.5	10.5
9.0	7	16.4	13.1	9.5	28	5.8	40.9	6.0		26.7	35.9 A	7.0		59.7	41.8 A	8.0		50.2	36.4 B
8.3		18.7	9.3 R	9.0		11.5	59.2 A	9.1	46	0.0	54.5	9.2	3	10.2	44.3	7.7	19	52.6	5.6 L
6.5		47.1	15.8 L	8.8	29	1.0	49.9 A	9.5		23.4	12.0	9.5		19.3	46.3	8.0	20	8.9	8.4 L
8.1	8	1.0	22.0 L	9.3		2.3	35.8	9.4		25.9	20.5	9.2		59.7	1.7	9.4		10.4	44.4
9.5		5.2	53.8	8.8		21.3	25.5	9.0	47	36.7	22.0	9.2	4	1.5	39.8	9.4	22	1.8	8.5
7.5		15.4	8.2 L	9.5		37.8	23.5	9.0		42.1	52.3	7.9		13.1	51.1 B	7.3		26.5	34.4 L
9.5		43.8	41.4	9.5		40.6	34.9	9.3		50.7	48.6	9.3		41.4	26.9	7.6		26.6	53.4 B
9.4		59.1	5.6	9.5		46.3	31.0	8.5	48	1.4	37.9 A	8.5		42.2	7.4 R	9.0		31.5	2.0
9.2	9	32.8	31.5	9.5		58.3	30.5	9.3		3.4	44.1	8.3		55.7	2.0 B	9.4	23	20.4	41.4
9.4		38.5	28.5	8.0	30	4.0	56.5 A	9.3		7.9	51.0	8.7	5	8.6	40.6 B	7.7		38.0	56.2 A
9.3		48.2	23.0	8.0		19.2	13.5 A	9.5		28.4	21.5	9.5		18.7	50.5	9.4	24	32.1	13.3

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	19ᵘ	+48°			19ᵘ—20ᵘ	+48°			20ᵘ	+48°			20ᵘ	+48°			20ᵘ	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	24 39.2	23.4	B	8.8	46 12.9	21.5		9.5	0 40.8	25.8		9.5	13 20.6	6.5		7.9	25 33.7	9.4	A
9.4	25 27.2	22.2		9.2	13.6	9.9		9.0	50.4	15.8		9.2	32.9	18.3		4.9	34.9	28.2	A
9.5	26 13.4	43.4		9.5	20.5	0.3		9.5	1 2.6	44.1		8.7	34.1	23.5		8.5	45.3	33.6	A
8.7	14.4	21.2	B	9.5	26.0	1.2		9.2	4.5	59.2		9.5	41.2	29.7		9.2	47.0	36.2	
7.0	27 1.7	16.5	G	9.5	31.0	2.8		9.5	21.7	0.2		7.8	48.9	35.4	L	9.0	54.6	3.6	A
9.5	20.7	10.4		8.4	32.9	28.5	A	7.5	23.3	9.1	A	9.5	58.5	34.0		9.5	26 17.7	43.5	
8.5	35.6	8.4	A	8.8	35.6	45.7	B	8.4	30.1	6.5		9.5	14 22.7	48.2		9.1	20.4	29.8	
9.1	46.3	13.7	B	9.5	37.0	1.7		9.4	34.5	15.8		9.3	23.5	59.0		7.5	24.2	43.4	A
8.3	51.1	15.0	A	9.0	50.0	29.7		8.7	47.2	9.7	A	8.8	42.5	23.0	A	9.1	29.0	22.9	A
8.9	56.0	39.9		9.5	47 10.5	27.5		9.5	47.5	23.6		9.3	15 4.5	38.7		9.2	40.6	23.0	
9.5	28 8.9	26.5		9.4	13.9	4.0		8.9	2 3.1	45.9	A	9.5	12.3	15.6		9.5	42.3	18.0	
9.5	44.4	32.9		9.2	21.6	9.6		9.5	3.5	1.5		9.5	24.2	49.6		9.5	45.5	3.7	
9.4	29 28.9	33.4		9.3	24.0	18.9	B	9.5	6.0	41.9		8.3	37.1	59.2	A	9.4	47.3	49.2	A
6.5	42.5	55.5	A	9.0	36.0	36.3		9.5	9.1	23.5		9.2	40.2	9.8	A	5.9	49.6	43.6	A
9.2	49.0	3.1		9.5	42.0	29.7		9.1	13.9	8.6	A	8.6	40.2	28.1	A	9.2	27 5.3	28.0	
9.4	30 31.7	56.2		9.2	48 34.7	13.9		8.4	14.7	40.1	A	8.9	16 3.0	58.2	A	9.3	29.2	38.4	
9.5	49.2	59.2		9.3	54.9	2.7		9.5	37.6	52.7		9.5	8.5	58.0		9.4	43.5	28.6	
6.8	32 31.9	11.0	A	9.5	49 44.4	2.5		9.5	50.8	15.3		9.2	9.3	45.9		9.5	28 15.4	57.0	
9.5	33 2.0	23.5		7.5	50.7	52.3	A	9.0	3 12.2	10.4	A	9.1	15.9	54.2	A	9.5	46.8	12.8	
9.5	5.6	32.4		9.3	50 17.9	8.7		8.9	20.5	3.1	A	9.5	18.4	37.6		9.5	29 14.1	23.9	
9.5	12.8	35.0		9.0	34.1	56.8	A	8.7	23.4	47.7	A	9.3	38.1	44.7		9.5	16.7	38.0	
6.6	56.9	55.8	A	9.2	52.0	2.0		9.4	30.0	30.4		9.5	49.9	4.7		9.1	32.9	20.3	
8.9	34 18.3	2.3	A	9.5	51 12.9	41.4		9.5	45.6	18.6		8.8	17 16.7	10.4	A	9.5	39.9	49.2	
9.3	35 2.2	32.9		8.2	46.6	47.9	A	9.1	51.6	36.3	B	8.5	34.2	59.4		9.3	59.1	55.5	
9.0	3.4	16.0		8.9	53.6	45.9	A	9.5	4 24.9	42.4		8.7	41.6	46.6	A	9.0	30 0.8	13.1	A
8.8	5.2	5.6	A	9.3	52 22.7	25.0		7.3	32.2	29.2	L	9.5	18 0.4	28.0		7.4	10.6	40.9	L
9.2	11.9	2.1	A	9.5	48.2	57.3		9.5	5 8.6	35.5		8.4	22.0	2.7	A	9.0	20.4	22.2	A
9.4	24.1	29.0	B	9.3	49.9	22.0		9.5	10.8	59.7		8.1	41.5	20.6	A	9.5	20.9	52.1	
9.0	28.8	3.1	A	9.3	53 18.9	17.0	A	9.3	37.5	2.2		9.5	53.4	45.8		9.3	25.6	42.8	
9.5	38.4	35.4		9.2	19.5	2.7		9.5	38.7	9.1		9.4	59.5	5.2	B	9.2	26.6	48.1	
9.5	59.0	48.4		8.9	42.7	28.0	A	9.1	6 2.8	32.5	A	9.5	19 15.7	3.7		9.5	47.0	49.6	
9.0	36 13.9	15.0	A	9.4	54.6	34.2		9.5	7.1	21.0		9.5	17.0	40.1		9.5	52.2	59.3	
8.2	17.4	35.9	A	9.5	54 7.0	39.1		9.2	18.3	57.4		9.2	29.5	22.1	A	9.2	59.0	54.0	
7.8	40.1	10.5	A	9.3	7.8	50.1	B	9.2	23.7	29.1		9.4	39.0	56.8		8.8	59.8	14.2	A
9.4	37 8.8	32.9	A	9.1	55 38.5	44.6		9.4	7 9.5	26.3		9.4	46.2	27.4		8.3	31 19.9	49.8	A
9.5	59.9	20.0		9.0	44.6	24.6		9.5	28.6	47.9		9.4	55.6	2.7		8.9	32 33.0	53.6	A
9.5	38 9.4	58.8		9.4	53.2	4.8		9.0	8 18.3	19.2		7.7	20 8.1	13.6	A	9.5	37.1	17.7	
9.2	32.0	11.3	B	9.1	56 1.8	31.6		9.5	27.6	59.0		9.1	31.3	15.6	A	8.5	37.9	15.6	L
8.2	42.4	6.0	A	9.2	28.2	31.8	B	7.6	48.7	45.2	A	9.4	50.8	11.0		9.5	38.9	31.2	
9.3	55.0	50.8	B	9.3	33.5	37.0		9.4	56.3	52.8	B	9.5	57.6	48.0		8.9	59.5	0.3	
8.0	39 21.0	13.0	A	9.1	39.0	58.6		9.5	9 1.2	58.8		9.5	21 1.6	24.6		9.5	33 10.0	56.6	
7.1	32.9	25.5	A	9.4	48.1	58.6		8.3	30.3	29.1	A	9.1	21.0	2.2		9.1	34 18.9	14.7	
8.0	35.2	34.9	A	9.2	56.3	53.2		9.4	46.6	45.2		9.2	22.7	48.1		9.2	59.4	8.3	
9.3	40 32.5	58.8	A	9.3	57 17.4	55.0		9.2	10 12.0	6.2	A	9.5	26.0	38.3		8.8	35 23.1	17.6	
9.4	36.4	47.9		9.3	17.9	6.7		9.3	21.5	55.6		9.5	56.5	35.6		8.8	53.5	24.4	
9.4	41 52.1	20.2	B	9.5	41.8	16.5		8.3	36.5	58.2	A	8.8	22 14.3	48.6	A	8.9	36 0.2	16.7	
9.5	55.5	14.7		9.5	57.0	38.8		9.0	51.4	55.0	A	9.5	20.3	24.8		8.9	2.0	28.8	
9.5	42 1.8	3.4		9.0	59.2	43.1		9.4	58.9	53.2		6.0	36.4	54.3	A	9.3	7.0	52.0	A
8.7	21.9	6.0	A	9.5	58 21.3	47.0		8.6	11 3.5	5.4	A	9.5	37.8	40.7	B	8.5	16.9	53.7	A
8.6	54.6	33.9		9.5	33.5	1.2		8.4	30.6	59.4	A	9.4	54.9	2.1		9.4	48.2	41.6	
9.3	43 31.5	24.5		9.4	33.8	50.2		8.5	32.6	0.5	B	9.1	23 29.5	1.2		9.1	37 5.3	7.1	
9.0	39.8	35.9		9.5	59 6.9	16.3		9.5	38.3	37.7		9.3	31.7	29.0		9.5	32.2	52.6	
9.5	52.4	24.5		9.5	9.6	3.0		9.1	52.2	41.6		6.8	24 1.2	26.4	L	8.5	54.8	44.9	A
9.5	53.7	7.6		9.5	33.1	59.2		9.4	12 0.4	16.1		9.5	5.0	54.9		9.0	57.8	44.9	A
9.0	59.8	4.0	A	9.5	35.0	19.4		9.4	4.6	5.5		7.7	20.1	23.2	P	7.2	38 18.3	32.1	A
8.5	44 16.8	52.3	A	9.2	51.5	4.0		9.5	28.6	29.8		9.2	21.4	12.4		9.4	31.9	24.7	
8.9	45 15.7	41.4		9.5	0 9.7	46.4		9.5	29.3	50.8		7.4	25.7	46.9	L	9.2	48.7	41.6	A
9.3	46 2.7	18.0		9.1	11.1	54.6	A	9.5	40.0	17.5		8.9	25 26.5	38.7		9.4	52.6	58.1	
7.8	3.9	3.0	A	9.4	31.3	31.0		9.5	55.9	54.7		9.5	28.1	7.4		9.3	39 3.3	54.0	
8.8	4.3	33.7	B	9.5	38.6	57.4		9.4	13 12.0	57.0		8.5	31.0	17.4	A	9.4	5.8	56.8	

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	20u	+48°			20u—21u	+48°			21u	+48°			21u	+48°			21u	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	39 49.2	38.3		8.9	55 43.2	9.0	B	8.8	10 30.9	12.4	A	9.2	20 50.0	57.9		9.3	31 54.0	0.7	
9.5	40 21.2	44.5		9.3	45.0	59.2		9.4	40.8	45.9		9.5	59.5	28.0		9.5	32 2.6	7.6	
9.5	22.8	54.1		8.8	51.8	12.9		9.4	42.0	1.9		9.5	21 1.0	43.0		9.5	12.6	4.5	
8.8	33.9	31.4		9.4	58.5	9.6		9.5	48.8	57.9		9.1	4.9	41.7	A	9.5	14.7	0.6	
9.3	41 23.6	40.7		8.4	56 4.8	57.5	A	9.5	52.9	25.6		9.2	17.8	33.8		9.5	22.0	44.0	
9.5	26.8	46.8		9.5	9.2	22.7		8.2	58.7	29.7	A	8.0	23.1	38.7	A	9.2	24.8	53.7	
9.4	42 8.1	45.1		8.5	33.0	0.6		8.9	11 17.6	40.5	A	9.5	24.0	1.8		9.5	39.2	55.4	
9.0	22.7	29.6		9.5	38.2	35.0		9.5	18.5	36.6		9.3	24.4	42.8		9.5	40.0	10.6	
8.3	44.3	8.2	B	9.5	56.4	8.4		7.0	26.2	11.0	A	8.5	39.1	8.6	A	9.1	45.7	4.6	B
8.0	44.9	18.9	A	9.1	57 36.0	19.1	B	9.4	27.5	56.5		5.5	43.7	12.2	A	9.5	58.2	43.2	
8.1	49.5	51.4	A	8.5	58 10.8	27.9		9.4	51.8	14.4		9.1	22 53.5	0.8		7.6	33 11.2	3.7	A
9.4	58.2	54.4		9.2	18.3	52.1		9.4	55.8	50.3		8.5	23 5.2	13.4	A	8.2	12.4	47.1	B
9.5	59.3	28.7		9.3	23.5	19.5		9.1	12 41.5	25.0		9.0	5.9	20.7		9.4	48.5	4.0	
9.5	59.8	37.7		9.5	54.7	13.8		9.4	13 9.6	32.7		8.8	20.0	49.1	A	9.5	34 18.7	13.4	
9.5	43 20.0	0.2		9.1	55.4	45.8		9.5	15.7	4.0		9.3	55.7	43.2		9.5	21.4	50.3	
9.5	53.4	20.1		9.5	59 1.3	34.0		9.4	19.8	20.8		9.2	24 9.0	9.7		9.4	34.1	28.9	
9.5	44 36.2	28.0		8.0	7.8	39.8	A	9.5	20.1	58.2		9.5	24.9	11.9		7.0	38.2	28.6	L
9.4	37.4	26.3	B	9.5	44.9	30.3		9.0	26.3	54.0		8.9	29.1	20.5	A	8.7	39.2	35.6	B
9.5	43.0	41.1		8.0	53.2	27.5	A	9.4	35.6	32.8	B	9.2	30.6	51.2		9.4	51.7	56.0	
8.6	45 2.4	35.9		9.4	0 17.0	39.2		8.8	59.4	6.5	A	9.5	44.1	11.1		9.5	35 6.8	39.5	
8.7	6.0	21.2	B	9.5	21.3	48.0		9.4	14 1.0	33.9		9.1	57.2	11.9	A	9.0	13.3	49.0	
9.3	7.5	19.2		8.7	34.8	7.4		9.5	1.2	2.4		9.0	25 22.3	2.6		9.4	17.4	56.5	
9.4	46 26.8	25.4		9.5	56.4	44.1		8.9	12.6	28.1		9.4	26 9.8	35.5		9.1	37.6	1.5	
8.7	33.1	57.2	A	9.2	59.8	11.2		9.4	21.4	22.5		9.4	16.0	56.8		8.6	39.1	32.5	B
9.1	33.6	3.3		9.5	1 18.1	25.7		5.4	30.0	53.9	A	9.0	17.0	1.1		9.5	55.0	42.0	
9.4	53.5	50.6	B	9.4	31.1	34.8		8.0	36.5	36.4	A	9.4	25.0	3.1		9.5	55.5	3.4	
9.4	57.6	22.6		9.4	38.7	49.5		8.0	53.5	1.1	A	8.7	40.8	57.5	A	8.8	36 6.4	41.5	A
9.5	47 15.6	38.2		8.5	42.6	2.9		8.2	15 18.0	44.2	A	9.4	43.1	29.4		9.5	12.6	46.3	
9.5	24.5	17.3		8.0	2 45.8	16.3	A	8.5	23.4	55.7	A	8.1	54.0	4.5		9.5	13.2	20.7	
9.5	25.3	49.7		9.5	3 10.0	50.6		9.1	41.3	46.1		9.5	54.1	46.7		8.8	25.8	32.4	B
9.5	35.0	11.0		9.5	15.6	45.2		9.5	43.0	8.5		8.2	27 1.9	0.0	B	7.6	29.3	38.5	A
9.5	43.4	56.5		9.5	42.5	52.5		9.4	47.9	28.3		9.0	16.0	22.1	B	9.5	49.0	40.2	
9.4	49.7	21.1		9.4	43.0	14.9		9.5	16 19.0	1.6		9.5	17.7	43.9		9.4	52.1	33.4	B
9.5	56.2	58.0		9.5	53.0	21.2		9.5	28.0	9.7		9.0	35.7	2.7		9.4	55.4	30.0	
9.4	48 23.4	13.7		8.5	4 6.9	9.4	A	9.0	36.7	45.8		9.5	37.0	52.5		9.0	57.3	57.4	A
8.9	24.5	56.7	A	9.5	32.1	13.4		9.5	57.9	16.5		9.4	40.0	22.9		9.4	37 7.3	25.9	B
9.2	41.6	50.4	A	9.5	52.2	41.8		5.5	59.1	46.0	A	9.3	45.8	58.1		9.4	17.9	38.9	
9.0	45.5	46.1		8.7	5 4.0	25.7		9.4	17 8.9	18.7		9.4	56.2	8.0		9.5	18.1	26.4	
9.3	57.1	37.7		9.5	4.0	34.1		9.3	22.2	23.6	B	9.5	28 11.6	5.5		9.5	18.9	38.0	
9.5	59.9	26.0		9.5	50.8	9.1		7.0	27.9	52.5	A	9.4	24.0	41.0		6.4	22.3	56.2	A
9.1	49 2.7	6.0		9.5	56.3	22.0		9.5	30.3	19.5		9.5	37.4	1.8		8.4	57.4	58.9	A
7.0	12.2	59.2	A	9.5	6 27.0	58.5		8.8	33.7	31.6		8.7	37.9	29.5		9.0	38 3.8	37.4	A
8.0	41.4	22.7	B	8.9	44.8	13.3		8.8	34.5	1.0		9.1	43.7	33.4		9.5	10.7	48.8	
9.3	50 24.6	15.6		9.5	55.0	9.1		9.4	37.3	52.1	B	8.4	44.9	46.0	A	9.1	15.2	36.6	A
9.5	48.1	18.5		8.7	58.1	2.4		9.5	40.8	45.8		8.0	29 2.6	5.8	B	7.4	16.8	13.3	B
9.5	51 13.1	2.8		8.0	7 6.1	24.8	L	8.3	51.3	45.5	A	9.4	5.4	43.1		9.4	37.1	18.8	
9.4	13.3	37.1		8.5	7.3	35.6	A	9.4	18 25.1	21.3		7.8	26.5	53.0	A	9.1	49.3	17.6	
8.7	25.0	8.7		8.6	27.6	54.7	A	9.1	35.4	17.1		9.0	27.2	3.3		9.1	55.4	0.2	
6.2	40.8	38.3	A	9.0	46.5	24.1		9.4	38.9	12.4		9.5	53.3	33.7		7.8	56.3	36.4	A
9.5	48.5	31.0		7.8	49.4	43.6	A	9.0	43.5	48.6		8.8	30 6.1	46.4	A	9.5	39 4.6	26.3	
9.5	52 22.7	43.9		9.5	49.5	17.0		8.8	52.4	54.7		9.2	7.5	43.3	A	8.4	25.2	51.0	A
9.4	38.7	20.0		8.0	49.8	0.1	A	7.5	19 3.6	11.8	B	9.5	17.9	6.7		8.5	25.7	51.5	
9.5	40.0	28.9		8.9	59.1	50.2	A	9.5	16.2	51.1		9.0	24.0	45.6	A	8.4	30.0	30.[illegible]	
9.5	53 5.3	52.1		9.5	8 12.9	1.8		8.8	30.6	7.4		9.4	46.0	57.0		9.2	32.5	3[illegible]	
9.5	11.5	35.0		9.5	40.0	55.8		8.1	43.1	46.2	A	8.5	53.5	0.9	A	9.4	48.0		
9.5	21.3	9.7		8.5	48.7	2.5	A	6.5	51.6	41.8	G	9.4	59.6	10.8		9.5	49.4		
8.2	26.9	12.0	L	9.5	9 13.5	8.5		9.3	20 12.0	43.1		8.5	31 3.3	42.2	A	8.6	40 [illegible]		
9.4	48.0	58.1		9.5	15.0	53.8		9.0	20.2	46.2	A	9.4	15.2	13.8		9.5			
8.8	54 16.0	18.7		9.2	15.2	41.1		9.0	23.3	55.4		9.4	33.4	53.2		9.5			
7.4	55 16.8	7.1	L	9.4	56.0	54.5		9.5	26.5	50.8		9.2	35.2	11.9		9.5			

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	21h				21h—22h				22h				22h				22h		
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.4	41 4.9	33.0	A	8.9	52 22.3	23.1	A	8.1	2 41.9	30.5	A	9.3	13 50.6	48.6		9.4	22 55.9	26.8	
8.4	8.7	19.1	A	9.0	29.2	11.7		9.5	47.9	10.4		9.3	51.3	44.7		9.5	55.9	4.3	
8.8	21.7	13.3		9.5	49.1	26.4		9.5	59.7	51.2		8.8	14 3.1	49.4	A	8.8	23 9.8	40.9	A
4.5	26.1	38.3	A	9.5	53 35.3	4.5		9.4	3 5.9	4.1		9.3	8.2	2.5		9.5	13.0	47.6	
9.5	41.5	9.1		9.1	41.1	8.1	A	8.6	35.8	55.7	A	9.0	9.8	27.3		9.5	43.3	59.5	
9.4	59.4	18.0		7.3	54 8.6	26.0	A	9.5	46.0	48.0		8.5	17.6	46.5	A	9.0	58.5	20.6	A
9.3	42 2.0	28.5		9.3	11.8	18.9		9.1	55.6	17.1		9.3	36.1	22.8		7.0	24 8.9	36.9	A
9.5	4.5	14.8		9.4	24.5	1.5		9.4	4 5.1	10.8		9.5	43.5	1.2		9.5	20.0	16.4	
9.4	44.9	29.4		9.0	31.0	12.1	A	9.5	19.0	42.6		7.6	49.2	28.7	A	8.8	35.7	6.9	
9.1	59.5	33.0		9.4	31.0	53.6		9.3	24.1	39.3	B	9.5	15 2.7	5.1		8.9	43.3	11.0	
9.5	43 7.8	36.1		9.4	37.9	59.9		8.9	27.3	29.4		9.3	13.1	46.8		8.1	48.1	0.6	B
9.5	18.9	53.5		9.5	49.4	38.0		9.5	5 6.9	1.3		9.5	46.0	45.7		9.4	25 4.8	56.2	
9.0	39.5	33.7		7.8	50.2	21.3	A	7.6	17.0	20.1	B	9.5	59.9	37.7		9.4	8.6	28.5	
9.0	44.3	18.2		9.5	55 27.0	45.8		9.5	19.4	9.1		9.5	16 2.0	18.0		9.4	36.0	8.1	
9.0	44.6	6.5		9.4	31.8	56.5		9.4	22.5	14.8		8.0	5.3	7.2	A	9.3	44.7	57.4	
9.5	47.5	46.6		8.9	59.2	39.5		9.5	47.2	15.4		9.4	22.6	22.4		9.5	56.1	27.0	
9.5	59.8	40.8		9.5	56 1.0	5.4		9.4	49.4	7.7		8.6	25.7	6.4	A	9.0	26 3.5	24.9	A
9.3	44 0.2	33.4		9.5	4.1	5.4		9.5	59.5	58.1		9.5	51.4	14.9		9.5	9.2	42.0	
8.6	20.6	7.2		8.3	10.6	53.9		9.5	6 21.6	15.4		9.5	57.9	50.7		9.5	35.2	7.0	
9.5	49.5	28.9		9.4	12.2	10.1		7.6	24.3	32.3	L	9.5	17 2.9	55.4		9.5	37.5	24.1	
8.1	58.7	38.0	G	9.4	14.5	11.8		9.5	26.6	16.1		9.1	3.0	17.5	A	9.5	40.7	10.6	
9.5	45 8.8	25.7		9.4	17.5	1.8	B	9.5	51.9	8.1		9.4	8.0	16.0	A	9.3	48.3	12.7	
9.3	9.9	27.1	B	9.4	50.8	29.7		7.4	7 11.9	39.2	L	8.9	25.8	57.2	A	7.7	53.3	38.5	A
7.5	14.8	45.7	G	9.5	54.0	31.5		9.4	15.5	55.6		9.2	29.6	5.6		9.0	27 34.4	41.7	
9.5	36.9	41.3		9.5	57 28.8	33.1		9.4	31.7	50.5		9.3	33.0	56.9		9.2	28 14.2	5.0	
9.2	46 6.0	28.0		8.3	37.9	9.1		7.1	35.4	39.4	L	9.0	35.5	40.0		7.6	33.3	0.6	A
9.3	7.5	8.4		9.4	47.4	19.2		9.1	40.8	56.5		9.5	52.4	13.0		9.5	46.1	10.3	
9.3	13.6	9.0		7.0	53.3	57.9	A	9.5	50.6	17.6		9.5	58.0	44.4		9.0	29 0.5	48.5	
9.1	50.9	13.2		9.2	58 8.7	22.7	B	7.0	54.1	45.1	L	9.5	18 2.8	16.0		8.4	6.1	3.5	A
9.3	56.1	6.8		9.2	16.6	19.4		9.5	55.8	30.0		9.5	7.1	46.1		9.4	11.8	5.8	
9.5	47 5.4	28.2		9.3	18.3	33.9		9.5	8 6.4	12.2		7.8	17.3	5.4	A	9.4	12.0	30.3	
9.2	6.8	55.9	A	9.4	22.5	41.9		9.1	39.4	59.6		9.5	35.5	20.2		9.4	13.0	42.7	
9.3	10.3	56.2	A	9.5	24.0	48.1		9.0	41.7	22.6		9.5	37.9	17.5		9.5	20.5	59.7	
9.5	29.0	22.1		9.4	38.0	32.9		9.0	41.8	59.1		9.5	38.5	8.4		9.2	37.0	5.5	
9.5	47.2	52.3		9.4	41.5	57.9		8.0	48.3	6.1	A	5.0	38.6	44.5	A	9.3	38.6	43.4	
9.0	55.8	40.0		9.4	53.9	7.1		7.3	59.4	37.8	S	9.5	43.0	4.4		9.5	53.0	41.9	
9.5	48 3.0	49.2		9.0	59 1.0	13.8		9.0	9 8.9	4.3	A	9.5	49.5	48.5		8.5	56.2	57.0	A
8.8	20.9	15.8		8.7	1.3	40.4		9.3	58.5	43.5		9.5	56.6	56.3		9.5	30 8.9	28.2	
9.5	50.2	31.6		9.4	17.0	59.7		9.0	10 24.3	59.0	A	9.5	57.6	53.5		9.3	35.7	56.2	
9.4	54.2	31.5	B	7.8	35.9	36.6	A	9.3	24.8	56.7		9.3	19 4.8	0.9		9.2	43.9	17.5	
9.5	57.7	2.6		9.5	40.3	29.4		9.5	29.4	37.3		9.4	13.0	55.9		9.0	31 3.4	24.2	
9.1	49 4.6	8.0		9.0	48.9	20.8	A	8.8	50.0	41.5		9.5	19.5	42.4		9.4	8.9	12.2	
9.5	9.6	41.2		9.5	56.5	56.8		8.6	11 4.5	19.3	A	9.5	22.4	41.4		9.5	16.0	14.4	
8.5	13.7	35.6	A	9.5	0 3.5	15.5	B	9.1	22.4	40.5		9.5	31.0	3.4		9.5	25.4	42.9	
9.5	27.5	48.8		8.8	7.9	31.5	L	6.6	40.6	24.2	A	9.0	56.3	56.0		9.5	29.8	2.7	
9.5	44.3	7.0		9.4	17.5	32.0		8.6	41.4	28.0	A	9.4	20 18.9	14.3		9.4	38.6	32.8	
9.5	49.0	50.4		9.1	44.4	47.8		8.7	41.5	53.2	A	8.6	22.4	40.9	A	9.5	41.5	27.0	
9.3	50.2	48.7		9.5	56.1	35.8		9.0	51.3	55.9		8.2	34.3	57.4	A	8.5	47.8	4.6	A
9.3	50 0.5	41.3		9.3	1 5.2	9.0		9.1	12 0.1	48.5	A	9.4	42.4	37.8		8.0	32 22.4	47.4	L
9.5	27.4	3.1		9.4	7.1	0.5		9.3	2.9	14.0		9.3	42.6	39.1	B	9.3	31.1	55.4	
9.5	51 6.0	7.1		9.5	11.2	3.8		8.8	12.9	37.9	A	9.0	45.0	21.5		9.3	31.4	8.1	
9.1	11.7	59.4		9.4	14.2	7.1		8.9	26.1	35.2	A	8.2	21 1.3	58.4	A	9.1	47.8	38.8	
9.3	17.2	11.2		8.5	15.3	33.7	B	9.0	39.8	56.5		8.5	4.8	57.7	A	8.5	49.5	25.2	A
9.5	27.4	36.9		9.5	29.5	49.8		9.4	44.8	56.9		8.7	5.1	38.0	A	8.4	50.4	20.5	A
9.5	35.8	8.8		9.4	55.1	38.2		9.3	49.7	27.2		9.1	12.7	52.6		9.0	33 2.9	40.9	
9.0	57.4	20.9	A	9.0	58.8	52.6	A	9.5	50.3	32.0		9.4	35.3	57.5		9.4	11.1	3.6	
9.5	52 1.6	25.0	B	9.4	59.9	55.2		9.5	13 16.5	54.0		9.4	35.6	59.9		9.4	33.2	57.0	
8.6	6.3	56.3		9.5	2 5.3	8.1		9.5	41.1	9.4		9.0	59.8	34.7		9.5	43.8	13.4	
9.2	13.0	2.9		9.5	13.4	57.7		9.5	47.9	2.9		8.0	22 39.5	43.1	A	9.0	50.9	20.4	A
9.4	14.8	27.9		9.5	26.8	10.6		9.5	48.9	13.7		9.4	44.0	58.2		9.4	34 19.6	31.8	

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	22h	+48°			22h	+48°			22h—23h	+48°			23h	+48°			23h	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	34 19.6	1.2		9.5	45 0.0	53.1		9.5	57 19.2	46.8		9.4	8 44.6	29.0		8.1	18 56.3	46.3	A
9.2	21.5	23.7		9.1	12.0	58.7		9.5	54.8	24.1		9.0	49.7	14.1	A	9.4	19 1.8	19.0	
8.3	32.8	4.8	A	9.5	22.4	31.9		9.4	58 4.1	32.3	B	9.5	52.1	5.0		9.5	2.9	14.2	
9.5	36.0	6.0		9.5	29.8	35.4		7.9	11.5	32.8	A	9.5	56.8	28.3		9.5	20.5	26.9	
9.4	53.1	6.1		9.5	53.2	50.0		9.4	22.4	52.7		9.5	9 10.2	56.7	B	9.1	23.9	16.8	
9.3	55.5	33.9		9.5	57.1	48.5		8.8	25.0	50.0		9.0	10 25.3	20.8	A	9.0	28.6	16.3	
9.0	35 6.3	17.5	A	9.2	58.6	10.4		9.5	29.0	1.9		9.5	34.5	26.8		9.5	34.0	55.2	
9.5	48.3	6.3		9.3	46 10.0	51.2		9.3	33.2	58.1		9.5	45.5	55.8		9.2	41.9	41.8	A
7.8	36 9.6	29.8	A	8.8	13.1	10.8		7.8	34.2	16.1	A	9.5	49.7	1.0		9.0	47.1	35.5	
9.4	17.6	5.7		9.3	18.0	44.5		9.4	35.9	2.1		8.9	11 2.5	26.9	B	9.5	20 2.5	45.6	
9.4	25.2	35.3		9.2	28.6	24.7		9.5	50.0	35.6		4.9	4.0	13.0	A	9.3	7.9	43.1	A
9.4	31.2	53.7		8.5	53.7	34.6	A	9.4	53.6	37.3		8.9	7.9	57.7	A	9.5	17.6	5.0	
9.5	52.9	55.3		9.4	47 8.9	30.0		9.0	59 14.5	36.8	A	8.4	12 19.7	3.6	A	9.5	20.8	45.8	
9.5	57.1	1.8		8.7	16.8	0.1	A	9.3	22.9	59.8		9.0	21.0	7.7	A	9.4	55.0	36.3	
9.5	37 0.6	56.4		8.9	38.5	29.3		9.5	40.8	10.1		7.7	23.1	7.3	A	9.5	21 1.0	25.9	
9.0	2.9	22.0		9.2	48 0.2	28.2		9.5	49.4	33.4		8.2	30.0	26.5	A	8.9	1.3	16.9	A
9.2	4.0	11.0		8.4	11.2	51.6	A	9.5	0 7.2	51.0		9.2	38.9	14.4	A	8.9	17.8	13.5	A
9.2	16.8	40.9		9.5	38.5	21.6		9.2	11.3	7.6		9.0	45.7	36.8		9.0	26.2	57.0	A
9.0	26.5	26.2		8.1	42.0	41.8	A	8.5	25.1	29.4	B	9.0	46.9	41.2		9.0	26.7	2.0	
9.5	38.4	25.1		8.7	43.4	46.4	A	9.1	27.1	7.0		9.2	13 4.0	19.2		8.9	31.3	49.0	
8.5	47.3	44.6	A	9.1	45.7	0.7		8.0	44.2	44.7	A	9.2	6.2	30.9		8.7	32.6	35.9	A
9.3	48.8	21.2		9.5	49 6.8	33.6		9.5	44.9	50.4		9.3	18.2	49.0		9.0	59.2	45.2	
7.1	38 7.9	39.1	A	9.5	25.0	14.2		8.0	56.8	15.7	A	8.7	35.0	55.9	A	9.1	22 7.8	41.1	
9.5	16.1	44.1		9.5	29.4	2.1	B	6.0	1 13.2	31.0	A	9.4	14 14.5	37.8		9.5	23.9	54.2	
9.4	32.1	32.4		9.1	35.6	40.5		8.5	44.1	19.3	A	9.5	14.5	41.7		8.5	33.8	26.9	A
9.2	35.3	15.7		8.9	49.3	45.9		9.5	2 4.6	9.9	B	9.5	16.9	41.6	B	8.0	47.7	18.6	A
9.4	47.6	43.0		4.6	50 6.4	57.8	A	8.6	16.6	37.8		9.4	23.0	14.5		9.3	23 9.9	15.0	
8.3	39 33.1	11.4	A	9.4	15.5	9.3		9.2	18.0	3.2		9.5	36.7	7.6		9.0	10.8	26.0	
9.3	56.4	3.2		9.5	17.5	8.6		9.5	24.2	8.5		9.0	41.6	25.2	A	9.4	13.5	53.8	
9.4	40 1.6	7.1		8.4	30.4	32.7	A	7.4	46.0	52.3	A	8.5	49.4	2.7	A	6.8	13.6	20.6	A
9.4	5.5	52.1		8.4	37.0	36.0	A	9.5	3 2.1	31.5		9.5	59.7	34.5		9.5	26.7	24.0	
9.4	13.6	17.0		9.5	48.9	18.6		7.0	40.6	13.3	A	9.0	15 1.3	18.0		9.0	31.3	28.0	
9.4	17.4	20.7		9.1	59.2	15.7		9.4	44.9	51.6		7.5	15.7	0.1	A	9.5	31.7	21.8	
9.2	22.8	17.8	A	8.3	51 6.5	29.0	A	9.5	4 25.1	6.9		8.4	24.3	45.3	A	9.5	37.2	48.6	B
9.4	35.0	48.6		8.6	16.0	13.1		9.5	26.6	37.0		9.5	35.4	34.8		8.9	36.1	32.5	
9.4	46.1	5.2		9.2	38.0	0.7		8.4	30.6	32.9	A	9.5	39.1	34.5		9.4	43.1	21.0	B
9.3	41 19.6	7.4		9.5	57.8	14.8		9.5	46.7	31.5		9.4	53.6	31.8	B	9.3	24 4.4	38.1	
9.2	28.9	15.9		9.5	52 7.3	9.5		9.0	5 1.1	12.6		9.3	54.7	10.2		9.3	11.5	42.6	B
9.1	30.3	43.5		8.5	11.0	30.8	A	8.4	17.6	33.2	A	9.0	58.0	11.6	B	9.3	13.9	31.4	
8.0	34.4	24.7	A	9.4	32.2	1.9		9.5	22.5	2.4		9.5	16 7.6	35.3	B	9.5	21.2	0.8	
9.3	39.1	19.5		9.4	53 3.6	48.2		7.5	24.1	26.2	A	9.5	25.1	15.2		9.5	29.0	48.1	
7.5	41.6	6.5	A	9.5	33.5	21.3		8.0	31.0	27.2	A	9.5	34.2	49.0		7.0	31.5	42.9	A
9.5	50.0	26.2		8.4	35.7	40.3		9.0	58.4	46.5		9.0	42.8	13.8		9.5	47.7	34.6	
6.8	54.9	49.3	A	9.5	44.2	5.8		5.0	59.1	36.7	A	8.7	47.7	29.4	B	9.3	25 1.8	3.5	
9.4	42 11.5	20.2		9.0	57.4	59.9		9.5	6 3.8	3.1		8.6	53.7	5.5	B	9.3	11.4	9.7	
8.5	16.1	33.1	A	9.0	54 1.5	40.0		9.5	17.9	13.6		9.5	56.9	6 8		9.5	15.5	28.2	
9.0	16.5	18.4	A	9.5	3.1	26.7		9.5	30.4	0.5		9.0	17 1.3	15.5		9.0	30.9	38.7	
7.5	48.4	48.1	A	7.8	11.5	36.8	B	9.0	37.6	38.4		9.4	9.3	43.4	B	9.5	46.5	6.4	
9.5	43 3.6	59.7		9.2	58.4	8.5		8.5	51.6	27.9	A	9.5	22.5	50.1		9.0	26 1.3	21.6	
9.1	7.1	7.6		7.7	55 7.2	15.9	A	9.5	56.7	21.3		9.5	38.0	18.2		8.8	18.3	8.6	B
9.5	7.8	0.2		9.3	27.0	29.5		9.5	7 32.0	46.0		9.5	43.0	19.0		9.5	27.8	57.7	
9.1	21.7	42.4		9.0	39.5	42.8		9.0	35.3	18.5		9.5	56.6	59.4	B	9.0	35.3	30.3	
9.3	38.0	55.1		8.8	56 3.4	50.2		9.4	36.6	41.0	B	9.1	18 10.4	16.6		9.5	41.7	1.3	
9.4	54.2	40.1		9.5	22.3	9.7		8.9	43.0	11.6	A	9.5	10.5	39.1	B	9.3	53.2	11.[illegible]	
9.5	57.8	43.9		7.8	36.7	3.2	A	9.5	47.5	55.1		9.5	11.5	9.0	B	9.4	27 0.3	39	
9.5	44 3.5	54.2		9.0	40.7	48.3	B	9.5	53.2	2.4		7.5	28.8	51.1	A	9.5	3.8	5[illegible]	
9.3	13.2	41.9		9.5	42.0	18.9		9.2	8 0.5	11.6		8.0	34.6	30.7	A	9.0	6.5	[illegible]	
9.5	25.3	45.3		9.1	46.7	17.9		9.0	13.2	3.3		9.5	45.8	10.7		9.2	37.3		
9.2	33.4	28.5		9.0	47.3	8.2	A	9.5	15.9	49.8		9.5	49.5	20.3		8.3	38.5		
8.4	36.4	51.5		9.5	57 7.0	34.8		9.5	37.7	4.7		9.5	49.7	57.5		9.2	41.3		

4101—4130				4131—4160				4161—4190				4191—4220				4221—4250			
	23ᵘ	+48°			23ᵘ	+48°			23ᵘ	+48°			23ᵘ	+48°			23ᵘ	+48°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.9	27 47.8	14.8		7.9	35 18.6	21.7	A	9.0	41 25.4	8.7	A	9.4	47 28.4	53.3		9.2	54 18.6	42.4	B
9.4	28 8.4	19.6		9.1	25.9	11.6		8.1	36.6	42.1	A	9.5	48 1.0	28.3		9.5	19.8	10.3	
9.5	33.5	59.1		9.1	26.2	48.2	B	9.2	36.7	52.6		8.0	12.9	7.7	A	9.4	36.4	35.2	
8.5	58.0	37.3	A	9.0	30.9	29.0		9.3	42 24.9	35.9		9.5	48.3	24.2		9.4	41.0	58.9	B
8.9	29 8.8	42.5	A	8.6	52.6	18.7	A	9.2	32.6	25.5	A	8.4	49 23.9	41.2		7.5	48.5	57.9	G
9.5	9.5	7.9		8.9	36 12.3	48.5		9.3	43.3	47.6		8.8	38.2	41.0		9.4	56.5	19.9	
8.6	14.0	56.0		9.5	13.2	58.2		9.5	43 7.1	47.0		9.1	52.1	50.4		9.5	55 0.1	14.0	
9.2	30 14.3	42.8		8.5	26.5	46.0	B	9.3	15.0	28.1		9.5	50 21.0	55.2		9.4	3.8	17.6	
7.9	27.8	33.7	B	9.5	28.8	9.3		9.5	38.6	39.0		9.5	30.3	3.3		9.5	7.8	47.7	
9.5	38.1	54.0		9.5	37 6.9	42.1		9.2	57.5	59.3		9.0	45.0	54.1		8.9	31.0	53.6	
9.5	42.3	30.0		9.5	12.3	40.4		8.8	58.9	10.1		9.5	55.5	15.3		9.5	56 3.8	11.4	
7.3	56.6	11.6	A	9.5	23.8	36.2		9.5	44 4.0	11.5		9.4	51 5.2	11.5		9.3	4.1	4.7	
9.4	31 1.1	4.2		8.9	40.0	5.9		8.4	41.1	13.6	B	9.5	24.4	16.2		9.2	24.2	20.2	B
8.6	12.0	7.8	B	9.5	41.3	53.6		9.5	43.6	12.3		9.3	33.8	39.7		8.7	33.6	53.2	B
8.6	35.4	5.0		8.6	52.9	13.8		9.5	52.4	3.5		9.2	52 35.1	29.6		9.3	35.9	53.9	
8.1	52.8	23.1	L	9.2	38 15.5	17.2		8.8	55.9	59.9	A	9.4	38.8	4.8		9.5	52.0	30.6	
9.5	32 11.8	3.0		9.5	20.4	4.8		9.1	45 19.7	44.1	B	9.0	44.5	14.0		9.5	52.4	14.9	
9.5	21.9	26.9		8.7	35.4	7.4		9.5	22.0	38.8		9.4	48.5	20.0		9.5	54.9	39.8	
8.7	49.0	8.0		9.5	42.8	13.1		9.1	22.9	14.0		9.5	59.8	46.8		9.0	57 26.9	50.8	
9.0	58.2	55.1		9.4	43.9	37.7		9.0	29.8	49.2		8.6	53 5.4	29.1		9.5	32.1	7.3	
9.4	33 4.1	0.2		9.3	39 11.0	38.2		9.5	36.3	10.3		8.8	16.5	42.7		7.4	55.6	58.4	G
9.5	17.0	20.0		9.0	11.0	41.0		9.5	57.3	29.1		9.3	22.1	57.6		9.5	58 22.4	57.0	
9.4	17.0	24.0		9.5	11.9	0.3		8.8	46 3.7	46.3	A	9.4	34.6	36.0		9.4	25.5	2.7	
8.6	34.6	53.3	A	9.5	17.3	6.5		9.5	11.9	52.4		9.4	51.9	46.3		7.2	28.7	49.3	G
9.5	50.2	52.5		9.4	30.5	23.1		9.5	14.8	48.7		9.0	53.7	56.7		9.5	49.1	56.7	B
8.5	34 6.2	17.8	A	9.4	52.7	0.9		9.5	15.0	53.6		9.5	53.8	3.5		9.4	56.5	58.3	
6.5	23.0	43.1	A	9.5	40 12.9	17.6		9.4	27.8	0.6		9.5	55.5	2.8		9.3	59 0.9	49.5	
9.5	44.0	49.8		7.3	21.6	29.3	A	9.5	28.5	13.8		8.5	54 4.3	12.2	B	8.7	23.6	34.4	A
9.0	44.5	36.5		8.1	49.8	59.1	B	9.3	37.8	14.2		9.5	6.4	41.4		9.4	41.4	12.9	
8.5	56.0	55.9	R	9.2	57.9	50.5		7.7	47 6.2	7.0	A	9.5	9.8	27.8		8.7	44.3	44.6	

Zone +49°

1—40				41—80				81—120				121—160				161—200			
	0h	+49°			0h	+49°			0h	+49°			0h	+49°			0h	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	0 19.6	15.6		9.0	9 52.2	29.1		9.5	18 22.1	57.2		9.5	24 54.0	16.5		7.6	33 39.6	2.0	A
8.9	38.2	52.5		9.5	10 41.3	23.0		9.1	30.7	41.0		9.4	56.9	37.7		9.2	47.4	0.6	
8.0	53.9	26.5	A	7.5	11 17.7	53.4	L	9.5	48.4	0.4		8.2	25 7.0	41.7	L	9.2	49.1	34.5	
9.2	1 5.0	23.1		9.3	25.9	11.2		8.6	49.3	46.9		8.9	29.6	3.5		5.1	34 0.5	42.8	A
8.7	13.5	17.6	A	9.4	46.1	23.8		9.5	54.3	50.4		9.5	33.1	27.1		9.5	7.0	45.8	
9.4	16.6	6.9		9.3	48.0	42.0	B	9.5	56.0	47.2		8.4	42.9	18.4	L	9.5	35.3	13.1	
7.7	29.8	3.1	A	9.5	52.3	42.1	B	9.4	19 0.4	58.0		9.5	26 8.8	29.8		9.5	37.8	31.2	
9.5	52.7	5.0		8.8	55.4	14.2		9.5	4.9	38.2		9.5	16.7	23.7		9.1	47.2	2.1	B
9.4	54.6	53.1		8.3	12 8.4	56.6	A	9.2	22.0	11.3		9.4	19.4	9.0		9.4	47.8	55.7	
9.3	59.2	28.7		7.9	23.5	18.4	B	9.5	23.3	21.4		9.5	36.0	4.0		9.5	35 15.3	59.5	
9.4	2 3.1	52.2		9.5	30.3	6.9	B	7.1	24.8	11.2	A	8.5	43.8	26.2	L	8.0	21.4	6.2	A
9.5	11.0	42.4		8.6	35.2	52.1	A	9.1	32.1	4.6	A	9.4	46.6	6.4		9.4	27.8	34.7	
9.0	16.6	56.6		9.5	13 1.4	58.4		9.5	33.6	49.6		9.3	46.7	41.2		9.5	36 6.1	20.0	
9.4	16.9	49.9		9.0	6.1	7.1		9.5	48.5	0.3		9.5	58.9	30.6		9.5	26.1	11.7	
9.5	24.0	43.5		9.5	37.0	50.9		9.1	57.4	13.5	A	9.4	27 15.6	16.9		9.4	40.2	58.6	
9.1	34.7	21.8		9.4	53.6	36.8		9.5	20 21.4	28.3		9.5	24.7	42.1		9.2	48.0	43.0	
8.0	46.2	4.9	A	9.4	14 1.3	34.8		9.0	22.0	39.5		9.5	52.4	28.2		9.5	56.9	21.2	
8.0	53.3	4.6	A	9.5	3.4	1.6		9.5	52.6	52.2		9.4	28 36.1	54.0		9.4	37 4.7	39.3	
8.4	3 4.6	19.2	A	9.5	5.0	3.7		9.3	21 20.9	48.2		9.4	50.5	54.8		9.4	8.0	5.7	
8.6	10.2	9.5	A	9.5	5.0	44.9		8.7	27.8	19.5	A	9.0	29 2.2	18.7		9.4	19.1	56.1	
9.4	16.5	46.1		9.4	41.8	9.8		9.4	37.8	42.5		9.0	3.0	53.5		9.5	20.0	58.8	
8.5	56.1	28.9		9.4	45.0	44.6		8.8	42.8	34.8	A	9.4	19.8	7.1		8.2	44.4	3.2	A
8.2	4 16.1	41.5	A	9.2	50.2	44.5		9.5	22 3.1	19.0		8.5	22.6	30.8		8.8	38 14.5	16.8	
8.7	20.2	56.9	A	9.5	15 42.3	15.2		9.5	23.7	7.4		9.5	52.3	11.5		9.5	23.0	48.1	
9.5	36.8	35.5		9.1	43.9	21.6		9.0	45.9	36.4		9.5	30 27.9	48.5		8.7	28.6	41.3	
8.7	44.0	49.4	A	9.5	16 3.3	41.5		9.4	51.0	52.6		9.5	27.9	33.1		8.7	38.9	28.8	A
9.1	44.7	11.6		8.5	7.4	25.8		9.0	54.0	27.7	A	9.4	35.5	39.3		9.2	43.7	59.6	
9.5	5 4.0	37.2		8.8	42.2	45.3		7.5	23 9.9	27.5	A	9.5	53.1	12.1		8.5	47.2	29.7	A
8.7	23.4	19.4		9.3	45.5	11.9		9.5	10.4	53.4		9.5	31 46.8	49.7		9.5	53.8	18.5	
6.7	28.5	7.3	A	9.4	52.8	4.2		8.4	23.1	2.4	R	8.9	54.7	58.1	A	9.5	58.3	0.4	
9.5	44.6	37.3		8.8	17 12.0	30.5		9.1	27.2	13.8		9.2	32 13.3	19.1		8.3	39 2.4	51.5	A
9.5	6 14.5	13.5		8.4	17.4	55.5		9.0	29.5	31.9	A	9.5	23.0	3.8		7.8	18.8	37.1	A
9.5	37.2	56.1		8.6	23.6	17.8		9.3	47.1	5.4		9.4	24.4	48.8		8.3	30.5	54.[illegible]	
7.8	51.5	30.0	L	9.5	23.9	23.1		9.5	51.3	14.9		9.1	25.2	18.3		9.5	36.5	[illegible]	
7.5	7 57.2	15.0	A	9.5	24.0	8.0		9.3	24 10.6	45.0		9.4	46.5	34.4		9.5	38.8		
9.4	8 4.0	48.2		9.5	24.1	0.4		8.8	11.9	12.4		9.4	56.2	4.3		9.5	39.[illegible]		
9.5	26.3	17.5		9.5	24.5	2.4		9.5	39.9	11.0		8.3	33 6.6	10.1	A	9.4	5[illegible]		
8.8	44.6	26.4		9.1	30.6	43.9		9.5	42.0	13.1		9.3	7.2	50.2		8.8	5[illegible]		
9.5	52.0	51.9		9.5	31.5	46.7		9.4	47.1	59.8		9.0	13.0	13.2		9.5	40		
9.0	9 34.4	46.4		9.3	18 10.8	36.9		9.4	48.8	16.8		9.3	16.1	23.8		9.3			

201—260				261—320				321—380				381—440				441—500			
	0ᵐ	+49°			0ᵐ—1ᵐ	+49°			1ᵐ	+49°			1ᵐ	+49°			1ᵐ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	40 21.5	9.2		9.4	51 59.3	38.0		8.5	3 46.2	21.6	A	8.6	18 26.2	16.7		9.0	33 33.0	16.0	A
9.5	27.0	33.5		9.0	52 17.2	35.0	A	8.3	56.9	45.0	B	9.5	31.6	41.1		9.5	48.7	33.1	
9.0	32.2	30.6	A	9.3	28.4	48.5		9.5	4 36.3	39.9		9.4	33.1	34.2	B	9.1	34 12.8	19.5	A
9.2	51.4	30.4	A	9.3	32.7	27.1		9.0	38.5	48.8		9.4	36.8	17.3		4.1	36.0	57.6	A
8.6	51.4	10.7	A	9.0	56.8	52.1		9.1	40.1	25.5	A	9.4	38.7	50.4		7.8	44.7	52.9	A
9.5	57.8	9.2		9.5	53 9.0	23.9		8.0	59.9	27.2	A	9.1	19 3.8	43.7		9.5	35 18.3	43.5	
9.5	41 3.3	50.0		9.1	12.8	41.8		9.5	5 1.1	34.2		8.9	23.5	13.4		9.5	33.2	37.0	
9.4	18.6	51.2		8.8	15.2	17.1		8.0	2.9	19.7	A	8.9	31.7	57.5	A	9.5	41.9	6.3	
9.5	22.3	15.2		8.9	27.3	6.1		9.5	6 5.1	47.7		9.5	43.0	23.5		9.0	46.8	22.5	
9.2	35.4	3.9		8.3	34.9	47.5		8.0	7.9	15.3	A	9.5	50.7	49.8		9.5	36 9.9	59.3	
9.5	43.1	27.3		9.5	45.2	38.2		9.4	39.7	27.5		9.4	20 0.6	6.8		9.5	22.7	29.1	
9.1	42 1.5	47.5	A	9.5	46.1	57.0		8.6	49.6	14.8	A	9.1	17.2	5.2		9.4	27.6	7.5	
9.5	4.9	39.3		9.5	54 8.8	59.3		9.3	7 0.9	40.9		9.5	20.4	24.0		9.5	28.8	47.2	
9.4	10.2	50.6	B	9.2	36.5	48.7		9.5	24.4	49.5		9.5	46.8	26.8		9.0	30.4	25.4	
8.0	13.8	50.6	A	7.9	55 4.8	32.0	A	7.4	29.0	7.4	A	9.5	54.2	4.5		9.3	33.6	39.0	
9.3	16.8	47.1	B	8.2	4.9	45.5	B	8.7	31.2	17.4		9.5	55.0	29.7		9.0	44.7	32.8	
9.2	30.0	18.3		7.7	18.3	39.1	A	9.0	35.9	31.3		9.1	21 1.5	58.4		8.8	49.2	18.0	
9.5	43 0.1	48.6		8.5	38.5	17.0	A	9.3	8 19.8	56.4		9.5	12.0	20.6		9.5	37 11.5	20.7	
9.5	6.1	37.8		9.3	46.4	49.4		9.3	22.4	10.5		8.5	17.5	11.6	A	8.8	26.5	40.4	B
9.2	35.6	51.9	B	9.5	52.3	51.8		8.7	22.4	7.2	A	9.5	53.1	51.5		9.4	38 40.3	24.5	
9.0	35.8	39.8		9.1	56 20.9	43.9	B	9.5	42.8	43.8		8.5	54.8	55.2	A	8.4	41.6	8.5	A
7.5	40.9	59.2	A	9.2	23.7	26.6		9.4	43.3	12.5		9.5	22 0.9	45.7		9.0	54.5	37.6	
7.8	46.2	13.3	A	9.3	37.2	42.1		8.9	9 40.9	6.2	A	9.1	7.8	40.8		9.5	39 14.9	38.3	
8.9	49.9	33.1	B	9.3	39.2	38.1		9.5	56.0	55.3		9.2	15.9	46.0		9.4	19.7	29.4	
9.3	44 6.1	41.0		9.4	39.3	38.6		8.9	10 0.8	39.9	A	9.2	20.0	47.8		9.5	25.9	39.3	
9.5	28.0	41.0		9.3	59.7	45.3	B	9.2	6.8	55.7		9.5	23 17.4	20.5		9.5	37.8	50.8	
9.2	42.8	58.6	A	9.5	57 21.5	25.9		8.8	7.8	23.8		9.5	35.8	38.5		9.4	52.8	58.2	
8.7	54.2	26.1		9.5	23.5	44.0		8.9	24.4	34.7	A	9.5	24 16.5	13.6		9.3	59.6	19.2	
9.2	45 43.8	45.3		9.4	28.9	15.6		9.4	28.0	56.1		9.5	49.4	9.6		9.3	40 2.0	26.3	
9.5	44.8	48.5		9.3	38.9	13.3		9.5	43.1	48.6		9.5	54.6	58.8		9.5	19.0	17.4	
9.5	47.3	49.7		9.4	39.4	53.9		9.1	11 1.8	7.5		9.5	25 3.5	13.4		9.5	38.5	35.4	
9.3	51.0	12.4		9.5	44.0	3.5		8.4	6.0	43.7	A	9.3	5.7	23.1		9.5	41 10.6	29.5	
9.4	55.9	13.9		9.2	58 10.9	5.9		9.1	36.7	44.5		9.2	13.9	5.1		9.4	46.3	29.6	
8.8	46 5.8	41.0		9.4	30.3	28.9		9.5	38.6	7.0		9.3	34.6	47.2		9.5	58.2	14.8	
9.5	34.0	23.0		9.3	30.9	50.1	B	9.5	12 7.5	30.9		9.5	26 55.5	9.0		9.5	42 3.2	50.2	
9.5	40.2	46.7		7.9	31.3	48.8	A	9.5	23.5	53.2		9.1	27 20.7	57.8		7.7	25.4	8.9	B
9.5	46.6	37.3		9.2	39.2	4.5		9.4	13 4.6	54.5		9.3	46.8	41.8		9.5	45.8	28.0	
8.8	47 20.4	3.7		9.4	59 1.7	27.5		6.5	10.4	21.5	A	9.5	28 10.6	12.5		9.5	56.3	44.3	
8.2	22.5	8.5	B	9.0	8.9	2.0		9.0	18.8	50.8		9.5	53.3	37.7		9.3	43 12.4	40.4	
9.2	30.7	58.7		9.5	20.4	37.2		9.2	23.1	56.9		9.5	55.0	53.8		9.2	16.1	20.4	
8.8	48.3	2.1		9.2	22.7	27.9		9.5	43.0	2.4		9.2	55.8	3.6		8.1	21.1	4.7	L
9.5	54.9	49.7		9.0	53.0	38.8		9.5	50.6	48.6		8.9	56.6	51.8	A	9.3	46.2	15.3	
9.0	55.0	41.0	B	8.5	55.8	34.9	A	9.5	14 58.5	4.5		9.1	29 17.7	32.5		9.5	44 2.0	53.6	
9.2	48 19.4	1.4		9.2	12.9	58.2		9.5	15 12.1	43.7		8.5	23.5	14.3	A	9.5	2.7	2.5	
9.5	26.4	36.2		9.0	42.0	34.6		9.5	21.0	57.1		9.5	30 0.3	4.5		9.4	16.4	59.9	
9.2	28.7	37.1		7.9	45.8	56.5	A	9.4	22.8	9.4		9.5	23.0	31.4		7.0	44.5	13.5	A
9.4	39.1	40.5		8.9	55.0	40.9	B	9.0	24.9	51.2		8.8	33.9	45.3	A	9.5	47.3	37.0	
9.4	57.5	10.0		9.5	2.8	24.3		7.9	41.6	43.8	A	9.5	38.3	8.4		9.0	45 8.2	43.7	
9.5	49 10.6	32.8		9.3	16.3	43.4		9.5	59.4	3.8		9.5	51.5	51.5		9.3	28.9	56.0	
8.8	20.7	12.3		9.3	16.6	37.3		9.4	16 5.0	20.5		9.4	31 27.6	1.8		9.4	31.0	7.6	
9.3	37.8	57.0		9.5	22.0	4.5		9.5	13.3	19.6		9.5	36.0	18.3		7.0	33.4	34.9	A
9.0	43.5	7.4		9.5	29.8	29.7		9.0	31.1	43.8	A	9.5	36.0	6.2		9.5	46 1.0	51.1	
8.8	50 1.9	13.3		8.9	58.7	54.1		9.5	38.2	35.5		9.3	41.5	32.0		9.4	13.7	1.8	
9.5	14.3	10.7		9.0	59.8	12.3		9.5	41.4	58.7		9.2	44.8	53.1		9.3	20.5	28.6	A
9.5	15.7	47.0		8.9	2 9.1	49.1	A	9.5	54.6	19.9		8.9	52.9	8.4	A	9.4	32.6	16.3	
9.2	32.0	54.2	A	9.2	45.2	41.8		9.4	17 17.5	7.4		9.0	54.7	33.2		9.5	34.1	47.5	
9.3	56.6	47.0		9.0	3 30.5	14.2		9.5	43.7	20.2		8.9	58.5	46.1		9.2	36.4	11.4	
9.5	51 5.1	34.2		8.8	36.9	20.2	A	9.0	18 5.9	19.1		9.5	33 4.2	57.5		9.3	38.7	59.0	
9.5	23.8	59.8		9.3	37.8	26.7	B	9.5	22.7	22.6		9.0	4.6	3.0		9.5	43.1	46.2	B
9.2	57.0	31.2		9.5	40.5	58.6		9.5	23.5	21.8		8.5	29.0	15.8	A	9.5	47 0.6	38.2	

501—560				561—620				621—680				681—740				741—800			
	1ᵘ	+49°			1ᵘ—2ᵘ	+49°			2ᵘ	+49°			2ᵘ	+49°			2ᵘ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	47 6.4	16.1		9.5	58 35.8	30.5		8.7	8 51.7	13.7	A	9.5	22 11.4	32.1		9.0	31 15.4	23.9	
9.5	10.0	13.9		9.5	48.5	59.8		9.5	9 1.6	52.5		7.0	23.5	31.9	A	9.2	18.3	53.0	
8.8	19.8	54.9	A	9.5	59.7	51.0		9.5	8.8	13.8		7.8	25.6	33.9	A	9.0	19.8	29.8	
9.5	26.9	20.8		9.5	59 8.1	17.7		9.5	10.5	56.7		9.2	32.4	29.3	B	9.5	26.3	20.7	
9.5	48 0.3	9.8		9.5	24.2	23.1		9.2	22.5	50.3	A	9.1	53.3	38.0		9.1	28.5	48.5	
9.5	14.5	45.8		9.3	53.2	35.6		9.4	25.4	21.5		8.8	23 3.5	7.8		9.5	53.0	29.8	
9.0	26.3	49.7		9.5	0 2.1	15.7		8.9	37.9	13.0	A	9.2	7.6	39.4		9.5	53.2	37.4	
9.0	27.0	54.3	A	9.5	18.0	35.7		7.2	40.8	28.2	J	9.2	18.4	6.7		8.2	32 47.2	50.4	A
9.5	28.2	9.4		9.1	1 17.8	44.0		8.1	41.6	50.8	A	9.2	23.0	31.2	A	9.0	48.1	18.2	
8.5	49 11.2	12.3		9.4	23.5	27.7		9.5	43.0	50.1	A	9.5	45.1	56.1		9.2	52.9	46.7	B
8.8	18.3	28.9		9.5	27.7	38.1		9.4	47.5	21.2		9.5	55.4	7.4		9.0	33 10.0	26.0	
9.0	50 7.0	53.5		9.4	44.1	18.4		9.2	55.4	49.3	A	8.9	24 13.3	27.2	A	8.6	42.8	46.1	A
8.4	16.5	42.5		9.0	54.0	9.5	R	9.5	10 16.3	44.3		9.5	24.2	56.2		8.8	44.1	58.2	
8.7	18.9	53.7	B	8.8	59.5	55.1	B	9.2	17.5	25.3		8.6	32.5	33.3	A	9.5	34 32.2	2.5	
9.1	28.0	46.2		8.9	2 8.7	57.7	B	9.4	42.8	13.9		9.2	33.1	7.8	B	8.7	46.7	35.6	A
8.4	36.9	54.0		9.5	12.6	15.9		9.5	57.7	31.6		7.0	57.3	25.5	A	9.4	49.7	54.3	
9.5	49.1	53.4		9.5	26.0	48.7		9.4	11 2.2	28.9		9.3	58.4	45.0		9.4	57.7	54.7	B
9.5	50.0	48.2		9.4	47.9	27.8		9.4	17.8	49.2		9.4	25 7.6	56.3		8.5	35 21.2	12.5	A
8.5	51 10.2	10.7	A	9.1	55.8	30.9		9.2	21.6	36.2		8.7	12.3	7.0	A	9.5	33.6	37.9	
9.1	16.2	45.9		8.7	56.3	33.9	A	6.2	24.1	29.1	A	9.4	14.2	50.8		9.0	45.1	59.4	A
9.5	23.0	35.0		9.5	3 10.7	39.8		9.4	40.9	56.2		7.8	27.3	13.4	A	8.4	46.9	35.3	A
9.5	32.9	4.4		9.4	13.6	1.4		8.4	45.4	0.1	A	9.3	54.5	59.6		9.4	47.4	23.1	
9.0	52.4	55.7	A	8.1	19.0	6.1	A	9.5	12 7.3	3.8		8.7	26 3.2	15.6	A	9.5	57.3	23.1	
8.5	52 5.6	27.9	A	9.4	36.7	6.0		9.5	16.9	29.4		9.3	10.1	13.2		9.2	36 13.4	26.6	
9.5	7.1	33.5		9.5	43.6	26.0		9.5	30.5	17.6		9.4	15.2	31.8		9.1	26.9	18.0	
9.3	10.3	48.4		9.5	44.8	14.4		9.3	55.5	53.4		8.5	23.4	38.0	A	9.4	29.5	29.4	
8.8	19.8	32.5	A	9.5	4 2.1	23.7		9.5	13 47.7	1.9		9.4	32.1	55.1		7.8	30.4	2.0	A
9.5	37.4	13.8		9.2	7.0	56.0		9.0	49.8	16.1		9.5	34.0	7.2		9.5	36.3	31.9	
9.5	38.3	47.6		9.5	12.8	44.2		5.8	14 48.2	20.5	A	9.5	37.2	26.5		9.5	58.5	41.8	
9.5	48.8	11.0		9.4	35.8	56.4		8.6	59.5	10.6		9.5	41.0	14.2		8.0	37 6.1	30.6	A
8.2	56.2	40.0	A	9.5	35.9	33.9		9.5	15 14.5	1.0		9.5	48.0	8.6		9.0	37.6	12.4	
9.5	58.3	33.6		9.5	36.0	26.0		9.2	15.7	5.9		9.5	27 1.8	7.6		9.1	46.4	35.0	
9.5	59.9	18.3		8.7	45.1	50.7		9.0	24.5	34.8	A	9.0	4.3	21.5	A	9.0	38 2.5	27.8	
9.5	53 0.3	26.7		9.5	51.4	16.4		9.5	25.1	35.8		9.3	8.4	45.8		9.2	3.0	45.5	
9.4	14.7	52.0		9.2	55.8	53.7		8.7	53.8	50.3	A	9.3	14.7	50.5		9.5	28.5	16.1	
9.0	37.1	46.0		9.0	57.9	37.0		4.9	59.4	36.9	A	9.3	16.1	57.8		9.5	39 6.8	5.1	
9.5	45.5	28.2		9.4	5 12.0	56.2		9.0	16 13.3	53.5		9.5	24.3	14.6		9.5	10.2	52.4	
9.4	54 20.0	32.0		9.5	13.7	13.9		9.5	30.7	8.3		8.4	30.2	20.6	A	9.4	25.0	15.3	
7.5	28.3	48.2	L	8.8	18.1	46.1		9.5	35.6	20.2		7.2	48.0	36.2	B	9.4	34.4	8.1	
9.3	47.4	0.4		9.5	22.3	42.4		9.0	54.6	2.7		9.5	51.3	53.7		9.5	47.9	30.4	
8.8	54.9	48.4	R	9.4	25.2	0.9		9.5	17 8.4	33.0		9.4	53.2	59.7		9.5	48.4	30.1	
8.6	55 5.8	33.2		8.2	42.7	38.8	B	9.4	33.7	6.0		9.4	28 6.4	34.6		9.0	54.8	24.5	B
9.3	47.0	3.0		9.5	52.5	12.6		8.7	36.5	35.4	A	9.0	8.8	21.1	A	9.5	40 11.0	4.9	
7.0	56 4.2	56.5	A	9.4	6 1.6	49.6		9.1	52.1	4.2	B	6.6	23.9	51.2	A	8.3	28.9	20.6	A
9.1	13.0	59.9		8.0	20.1	1.3	A	9.3	18 1.3	50.2		9.5	32.2	34.6		9.5	41 27.1	35.4	
9.1	31.2	53.6		9.2	25.1	21.8	B	6.5	10.6	55.0	A	9.4	59.2	40.5		9.5	42.4	43.1	
9.1	31.7	48.7		9.0	26.7	39.4		9.0	27.1	38.3	A	9.1	29 1.3	1.5		9.5	42 53.3	28.5	
8.5	35.8	20.1		9.3	26.8	42.6		9.5	39.0	23.0		9.4	25.3	49.9		8.5	58.6	45.6	
9.4	39.2	27.7		9.4	31.5	0.3		9.5	47.9	27.2		9.3	28.1	24.0		8.7	43 8.9	49.6	
9.5	45.5	7.3		9.5	38.0	6.1		9.4	19 7.7	8.3		8.5	35.3	29.4	B	9.2	9.1	28.7	
9.0	57 22.2	48.4		9.2	46.8	16.9		8.2	16.5			9.0	41.7	36.1		9.2	14.5	33.2	B
9.5	24.4	8.7		9.4	49.3	28.5		9.5	20 9.0			8.7	45.9	6.1		8.7	37.9	12.5	
9.5	26.5	25.9		9.5	55.3	56.5		9.2	2			8.9	46.6	53.4	B	9.4	38.3	48.9	
9.5	43.1	5.7		7.5	7 7.8	8.6	A	9.5					48.0	53.7		9.5	44 57.5	27.8	
8.5	57.2	35.5	A	9.3	21.9	0.1		8.8					50.7	51.5		9.3	45 18.4	50.6	
9.5	58 4.2	32.5		9.5	27.5	25.8		9.5					52.2	9.3		9.5	22.0	45.1	
9.5	7.3	54.9		9.4	42.8	38.7							52.3	39.8		9.5	44.0	56.9	
9.4	21.8	47.9		9.5	44.9	8.2							8	57.1		9.5	45.4	13.3	
9.4	24.0	37.9		9.2	45.4	7.1							5	2.3		9.5	56.3	57.4	
9.4	30.0	49.2		9.0	8 5.3	50.6								50.1		9.5	59.7	39.6	

801—860			
	2u	+49°	
m	′ ″	′	
7.7	46 31.8	12.1	B
9.5	38.4	23.4	
9.5	58.3	33.7	
9.4	47 23.5	44.8	
9.1	29.0	12.5	
9.4	40.4	47.2	
9.5	47.3	50.2	
9.5	50.4	6.9	
9.5	54.9	34.1	
9.0	57.5	17.1	
9.4	48 4.9	57.6	
9.5	33.3	43.7	
9.5	47.1	49.0	
9.5	49 3.0	2.8	
9.4	32.1	57.5	
9.5	51.6	31.3	
8.5	50 14.4	23.5	
9.5	32.1	43.0	
9.4	53.2	24.3	
9.5	57.5	5.3	
9.4	51 17.6	5.1	
9.5	23.7	27.9	
9.2	39.0	48.7	
9.5	52.4	23.4	
9.5	52 2.8	32.5	
9.2	8.7	30.9	
9.2	16.8	10.2	
9.1	29.7	9.4	
9.5	31.4	24.9	
9.3	58.8	58.3	
9.4	53 2.6	42.5	
9.2	5.0	4.1	
9.5	32.6	15.8	
8.7	50.8	8.7	
8.9	54 18.1	35.6	
8.2	22.1	27.3	B
9.2	28.4	36.1	
8.4	30.9	13.1	A
9.5	37.2	51.1	
9.5	50.6	25.8	
8.1	57.7	8.9	A
9.3	55 14.6	57.5	
9.3	21.5	54.2	
9.5	40.4	7.9	
9.5	50.3	19.1	
9.3	54.4	0.8	
9.4	56 0.9	0.3	
8.4	1.4	32.2	
9.2	46.8	48.6	
9.2	56.5	59.5	
9.5	57 1.3	23.3	
9.0	7.5	10.6	
9.5	10.0	40.0	
9.4	45.8	24.7	
9.5	48.0	59.0	
9.5	58 20.0	15.0	
4.3	38.3	3.5	A
9.0	59 8.6	1.5	
9	11.3	8.6	B
	23.7	5.1	

861—920			
	2u—3u	+49°	
m	′ ″	′	
8.5	59 40.3	49.6	A
9.1	0 5.7	7.3	A
9.5	20.5	55.2	
9.5	54.9	19.8	
9.5	1 5.3	27.5	
9.1	10.3	35.8	
9.4	23.7	46.5	
9.3	32.0	49.5	
9.5	35.2	45.0	
9.3	49.1	50.4	
8.3	55.3	42.3	
8.8	2 14.8	14.7	
9.2	53.0	54.4	B
9.5	57.1	55.9	
8.4	3 40.3	16.4	
7.4	40.5	1.6	L
8.7	46.1	49.5	
9.5	4 10.9	52.4	
9.3	45.5	23.4	
9.4	48.3	27.8	
9.5	49.8	22.9	
9.3	56.6	15.0	
8.7	57.0	4.8	B
9.2	5 6.3	47.9	
9.0	16.8	34.8	
9.5	21.5	6.2	
9.5	28.4	59.3	
8.3	36.1	19.6	
9.2	6 7.6	6.0	
9.5	15.3	37.6	
9.3	20.0	11.0	
9.5	41.8	23.7	
9.5	57.3	6.0	
9.0	7 8.1	16.1	
7.7	24.6	49.4	B
9.2	46.7	7.4	
8.9	47.3	21.9	
9.5	8 9.3	56.2	
5.7	19.8	42.4	G
7.5	28.9	14.0	A
9.5	46.7	48.9	
5.7	50.8	34.6	A
9.5	9 6.9	52.7	
9.4	10 41.9	27.0	B
9.5	44.9	12.5	
9.5	57.5	13.0	
9.3	11 24.8	52.1	
9.2	30.2	28.5	
9.3	44.3	26.9	
9.0	12 19.3	5.8	
9.0	44.1	11.4	B
9.3	48.3	29.6	
9.1	13 29.9	21.6	R
9.2	33.4	47.2	
9.0	51.5	58.3	
8.9	57.0	7.2	
2.0	59.4	20.7	A
8.9	14 0.9	48.6	
9.5	34.6	58.8	
9.1	38.9	42.0	

921—980			
	3u	+49°	
m	′ ″	′	
8.9	14 43.9	16.5	R
8.7	48.5	13.7	R
8.5	55.9	34.1	
9.2	57.3	6.0	
9.2	15 12.2	49.0	
9.1	12.3	27.3	B
8.5	17.5	33.0	
9.2	42.1	17.3	
7.3	45.8	14.3	G
9.0	49.9	44.5	
9.2	55.3	1.1	
9.3	16 1.5	26.6	
9.4	19.4	17.9	
8.9	33.7	59.5	A
9.5	17 18.1	17.8	
7.7	19.4	5.7	A
9.5	22.2	58.6	
8.3	55.8	27.4	A
9.3	18 9.3	45.5	B
9.0	9.3	7.3	A
7.7	14.1	56.0	A
9.5	16.4	48.5	
9.0	20.1	2.6	A
6.5	29.9	20.8	A
5.3	19 0.6	1.3	A
8.8	19.9	30.3	
8.6	24.3	39.2	
9.5	37.3	2.2	
9.1	39.9	29.6	
8.8	20 10.6	16.5	R
9.3	33.1	9.3	
7.0	39.4	58.8	B
8.2	51.3	12.3	B
8.0	21 5.5	24.1	B
8.0	19.8	54.8	B
9.4	21.9	5.7	
9.3	23.2	4.0	
8.5	34.4	23.0	R
8.8	48.4	2.2	A
9.5	22 15.4	21.2	
9.0	35.8	9.9	A
9.0	45.3	8.8	A
9.5	46.0	4.0	
9.4	23 0.1	11.2	
9.5	10.5	3.0	B
9.2	19.8	54.5	
9.0	24.9	48.6	
9.1	43.5	45.9	
9.5	24 21.3	7.8	
9.5	42.6	9.5	
8.9	25 30.3	31.6	
9.2	44.7	6.2	
9.5	26 2.8	12.7	
9.0	10.9	16.2	
9.3	43.9	13.4	
9.4	49.4	4.3	
9.4	27 16.3	24.0	
8.5	18.6	31.9	A
9.5	35.3	58.3	
9.0	38.8	6.8	

981—1040			
	3u	+49°	
m	′ ″	′	
9.5	27 43.5	49.2	
9.5	57.9	28.8	
9.2	28 22.3	37.2	
9.5	29 17.3	48.6	
8.9	21.2	28.9	A
9.2	53.8	33.7	
9.5	56.7	42.7	
8.8	30 0.8	6.7	A
9.2	16.9	57.5	
9.5	22.8	7.8	
9.2	28.9	1.7	
9.5	32.5	42.3	
9.0	55.3	18.2	A
9.2	56.2	38.7	
9.3	56.6	33.2	B
9.2	57.6	24.8	
9.4	31 2.3	26.2	
9.5	35.9	27.5	
9.5	54.8	56.9	
9.2	32 12.6	51.9	
8.6	22.6	44.0	B
9.0	22.9	5.2	A
9.2	28.6	20.9	
9.2	45.8	30.2	
9.1	53.9	8.5	
9.0	33 22.3	30.9	A
9.5	22.3	44.0	
8.9	26.9	4.7	A
9.0	35.6	33.7	A
9.0	38.0	50.0	
9.3	46.2	15.6	B
9.5	54.3	45.9	
9.1	34 27.9	8.9	
8.0	49.3	24.0	A
8.7	35 15.9	57.3	
8.9	26.9	48.6	
9.3	30.2	58.4	
9.5	36 4.9	9.5	
9.5	20.8	14.0	
9.5	23.4	23.3	
9.5	36.3	54.3	
9.2	50.0	31.2	
9.5	50.0	48.0	
8.4	37 1.6	54.3	A
9.2	5.7	7.5	
9.5	40.2	19.5	
9.5	50.8	57.1	
9.5	52.2	28.2	
9.4	56.1	35.7	B
9.5	38 4.2	56.5	
9.5	20.5	44.4	
8.7	33.8	56.3	B
9.5	42.3	50.5	
9.5	39 24.4	51.0	
9.5	40 4.8	50.1	
9.5	5.6	44.1	
8.8	25.2	1.5	
9.2	30.0	13.2	
9.5	45.0	2.7	
8.5	45.3	32.5	

1041—1100			
	3u	+49°	
m	′ ″	′	
9.0	40 55.8	20.9	B
8.4	41 1.9	20.5	B
9.5	13.1	12.2	
9.5	37.8	59.7	
9.0	41.6	30.7	
9.5	47.0	13.6	
9.5	58.9	13.3	
9.5	42 8.5	44.7	
9.5	29.4	19.5	
8.7	57.9	56.0	
9.0	59.9	40.1	B
9.5	43 2.3	45.5	
9.4	31.8	9.6	
8.5	32.4	59.0	
9.5	44.7	26.5	
9.5	55.4	19.8	
8.1	59.2	19.0	B
8.5	44 3.3	54.8	
9.4	9.6	13.9	
9.5	34.2	23.8	
9.5	53.0	14.7	
9.4	45 3.0	45.2	
9.5	15.1	22.9	
9.4	55.2	30.2	
9.5	58.4	56.4	
9.5	46 33.0	26.5	
9.5	37.1	16.2	
9.4	47 9.8	6.6	
9.2	12.9	6.3	B
9.5	37.3	25.0	
9.5	38.0	4.1	
9.5	42.2	56.8	
8.8	59.0	47.9	A
9.0	48 2.2	47.4	A
9.4	49 2.3	47.5	B
9.3	19.5	1.4	
9.2	25.0	41.0	
9.4	56.9	55.6	
9.5	50 5.2	24.6	
9.2	8.3	9.3	A
9.5	22.5	29.7	
9.5	32.7	23.9	
9.5	43.1	16.0	
8.1	51 12.7	30.8	B
9.3	34.6	42.5	
9.1	41.0	38.4	
9.5	50.3	13.4	
9.1	58.0	2.2	
9.5	52 42.0	49.6	
9.0	53 19.1	32.7	A
9.4	22.7	2.8	
9.0	26.2	24.6	A
9.0	39.2	13.5	
8.8	53.1	41.2	A
9.5	54 19.3	11.0	
9.5	25.2	50.5	
9.3	46.6	0.3	
9.5	55 4.8	40.8	
9.5	18.5	51.6	
9.4	48.5	13.2	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	3ᵘ—4ᵘ	+49°			4ᵘ	+49°			4ᵘ	+49°			4ᵘ—5ᵘ	+49°			5ᵘ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
4.2	55 49.4	57.3	A	8.5	9 59.7	55.0		9.0	29 52.8	43.5		9.4	48 8.8	17.5		9.5	9 36.9	48.0	
9.5	56 34.1	58.0		7.8	10 5.2	53.9	S	7.2	30 4.0	45.5	A	8.5	49 12.0	28.2	A	9.0	36.9	13.0	A
9.0	57 8.6	50.4	A	9.4	37.9	54.0		9.5	8.7	0.3		9.1	12.4	31.6	B	9.5	10 5.3	28.8	
9.0	35.1	43.4	A	9.5	39.2	18.3		9.0	31.9	55.2	A	9.5	16.4	16.8	B	9.5	34.2	23.5	B
8.1	42.6	29.6	A	7.5	53.0	40.7	A	9.4	58.2	26.9		9.4	50 49.5	49.1		8.3	12 13.7	24.0	A
8.5	54.2	52.8	A	8.9	11 15.3	37.8	A	7.0	31 11.8	37.6	A	9.3	51 22.8	29.2		9.2	37.8	18.5	
9.3	59.7	39.4		9.4	31.7	50.5		9.1	13.4	23.9	B	8.0	34.5	18.6	A	9.5	13 8.9	54.5	
7.3	58 0.2	48.4	A	9.3	41.5	8.7		8.9	31.7	47.8		9.0	52 0.0	18.8	A	9.5	53.1	10.7	
9.5	37.5	7.1		9.5	43.8	58.5		9.5	32 6.8	23.5		9.5	2.9	51.7		9.5	14 2.5	12.0	
9.4	59 4.3	15.7		9.5	12 1.0	31.0		5.5	21.7	41.9	A	9.5	35.5	11.6	B	9.5	21.3	27.0	
9.0	18.8	11.7		9.5	2.0	19.4		8.4	34.3	30.5	A	9.5	46.8	2.6		9.5	35.2	30.7	B
8.8	37.4	19.5	A	8.5	14.9	13.2	A	9.3	33 11.5	2.9		7.9	58.4	18.3	A	9.0	53.9	23.8	A
9.5	43.1	36.1		9.2	19.4	15.2		9.4	34 0.4	46.7		8.9	53 30.0	19.5	A	9.5	15 6.9	19.1	
9.5	45.2	58.1		9.2	42.7	49.9		9.5	2.9	48.7	B	8.0	30.8	32.0	A	9.5	17.5	11.3	B
9.5	59.8	38.9		9.2	13 37.4	20.9		8.4	29.2	17.2	A	8.5	33.2	41.5	A	9.5	16 23.5	50.5	
8.9	0 0.2	33.6	A	9.5	38.8	41.8		9.4	35 13.2	4.5		9.5	54 0.9	48.7	B	7.7	28.4	7.7	A
8.6	12.2	55.4		9.5	53.0	31.2		8.4	14.3	40.5	A	9.5	18.2	9.8		9.4	17 17.1	32.7	
8.6	25.5	14.3	A	9.1	14 20.7	12.8	A	9.4	22.8	13.0		9.1	20.9	50.7	A	7.8	18 13.4	3.1	A
9.2	26.7	6.0		9.5	40.2	47.6		7.8	36.4	52.8	B	9.5	32.0	28.4	B	9.5	25.6	12.5	
9.0	37.2	38.1	A	9.2	51.3	18.0		9.2	54.2	31.2		7.5	46.9	51.0	A	9.3	19 4.1	1.9	
9.1	1 1.0	22.2	A	9.4	16 8.0	1.4		9.0	36 23.3	18.5		7.8	55 7.3	46.3	A	9.4	34.0	39.7	
9.2	3.2	36.9	A	9.5	38.2	48.6		8.9	53.0	1.6	A	9.4	15.5	2.0		9.5	20 18.0	22.0	
9.0	22.9	41.5	A	9.4	57.8	32.1	B	9.4	37 13.8	12.3		9.5	32.4	57.0	B	9.5	21 4.0	51.3	
9.5	27.8	35.9		8.4	17 1.5	6.8		9.5	19.5	55.7		9.3	39.0	11.4		6.3	13.3	15.6	S
9.4	32.7	8.6		9.4	19.3	41.8		9.1	24.8	11.0		8.2	40.0	43.7	A	9.5	19.1	59.8	
9.5	49.8	31.1		9.3	23.8	34.6		8.4	45.8	16.5	A	8.5	56 10.4	51.6	A	9.5	46.0	5.7	
9.5	2 12.5	31.1		9.4	33.9	43.0		8.7	51.9	49.5	B	8.8	57 8.0	42.3	A	9.1	23 17.9	40.1	
8.8	15.0	56.7		9.2	44.3	46.7		9.5	38 6.8	21.1		9.5	44.3	37.4		9.0	37.4	9.2	A
9.2	18.8	1.0		9.0	18 44.9	28.6		9.0	11.2	9.6		9.5	58 26.0	47.4		9.0	24 13.1	55.3	A
9.5	23.2	19.5		9.0	19 21.9	54.0	B	9.5	13.3	46.8		9.0	34.9	16.9		7.5	13.6	28.4	A
9.4	38.7	10.5		9.1	36.4	54.1	B	7.5	42.2	19.2	A	9.5	59 4.6	10.1		9.5	47.0	21.9	
9.4	47.4	34.2		9.5	38.4	53.1		9.4	42.8	46.0		9.4	8.5	49.0		9.5	47.8	57.8	
9.4	53.6	9.3		9.5	59.6	54.4		9.5	52.9	30.5		9.1	15.0	48.1	B	9.5	51.9	53.3	
9.2	59.8	41.5	A	9.5	20 1.2	38.5		9.3	39 44.5	34.9		9.4	21.0	47.3		9.0	25 4.1	37.7	A
9.3	3 52.5	45.6		9.5	6.0	59.7		9.4	46.2	56.8		8.3	27.2	12.6	A	9.5	24.0	58.8	
8.8	4 1.2	7.0	A	9.2	11.5	44.3		9.2	40 4.2	35.9	B	9.0	30.9	29.3	A	8.7	57.2	42.5	A
9.5	16.5	36.9		9.5	27.4	29.6		9.3	5.8	43.9	A	9.5	42.6	54.3		9.5	26 27.4	23.4	
9.2	47.3	17.0		9.5	51.2	34.7		9.4	34.5	2.3		8.3	0 24.1	20.9	A	9.0	34.0	6.7	
8.7	59.2	21.8		9.5	22 25.1	23.8		9.5	56.3	3.7		9.4	26.3	41.1		8.5	27 16.9	52.5	A
9.5	5 9.4	52.8		9.5	23 15.6	15.2		8.7	59.4	54.4	A	9.5	31.4	11.3		9.2	38.3	44.0	
9.0	13.6	16.3	A	9.5	19.4	58.5		9.5	41 35.8	40.9		9.0	1 13.1	10.1	A	6.8	47.7	18.9	G
9.5	43.4	36.4		9.0	21.0	36.6		9.0	42.3	47.0	A	8.8	49.0	49.5	A	9.2	54.2	57.8	A
9.4	46.8	42.1		9.0	40.1	25.5	A	9.5	42 5.7	51.9		7.8	2 4.1	40.6	A	9.3	28 10.6	42.5	
9.3	50.3	13.6	A	7.1	47.8	48.5	A	8.8	30.6	24.3	A	9.4	11.6	51.8	A	9.3	37.4	7.5	
9.1	6 20.7	19.1	A	9.0	55.7	15.1		7.5	43 11.8	18.8	A	9.0	13.6	28.9	A	9.5	50.0	21.4	
8.7	32.8	43.7		8.6	56.8	17.9	A	9.5	20.3	51.0		9.3	40.5	54.8		8.8	53.5	55.3	A
9.3	52.1	2.9		9.5	24 1.9	32.6		9.5	44 15.6	15.9		9.3	51.5	59.7		9.5	29 48.8	14.0	
9.4	7 0.1	4.5		9.3	20.8	13.9		8.5	58.8	29.4	A	9.5	3 21.4	51.5		9.4	30 33.3	24.1	
9.5	10.3	59.8		9.5	27.9	0.3		9.4	59.9	26.7		9.5	34.4	59.7		9.2		50.4	
4.8	22.2	56.0	A	8.6	26 41.3	32.7		8.8	45 36.2	32.2		8.8	4 15.4	0.8		9		2	
8.5	27.2	19.4	A	9.4	27 0.5	52.0		7.0	57.7	40.6	A	8.9	50.6	22.0					B
8.7	41.6	29.9		9.5	19.2	6.6		9.3	46 3.8	21.3	B	9.5	5 22.3	59.4					A
9.5	43.0	50.8		9.5	21.5	47.5	B	9.5	5.0	32.7		9.5	50.4	11.2	B				
8.0	54.6	10.5	A	9.3	40.6	55.3		9.3	23.8	10.7		8.5	6 17.7	10.7					
6.0	8 22.5	41.0	A	9.4	57.3	36.9		9.4	25.8	50.2		9.0	40.6	24.9					
9.5	9 11.1	55.6		9.3	28 3.3	39.5		9.2	32.9	23.0		9.2	41.8	55.4					
9.5	19.1	55.2		9.5	24.7	34.1		9.0	37.5	59.0		9.0	51.3	5.[illegible]					
9.5	20.9	30.5		9.4	53.2	31.9		9.4	38.0	57.5		9.0	7 19.3	21[illegible]					
9.5	25.5	47.1		8.6	57.2	18.2	A	9.5	47 0.0	14.5		9.5	8 17.8	4[illegible]					
9.0	48.6	53.5		9.5	29 3.5	46.5		9.2	44.2	37.3	B	9.4	40.6						

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	5ᵘ	+49°			5ᵘ—6ᵘ	+49°			6ᵘ	+49°			6ᵘ—7ᵘ	+49°			7ᵘ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	35 52.2	31.8		9.2	58 43.6	9.2	A	8.7	27 18.9	26.5		9.4	49 53.6	27.8		9.2	22 45.5	31.2	A
9.5	36 17.6	6.9		9.4	59 19.4	41.0		9.4	38.5	21.3		8.8	50 25.3	4.8	A	9.5	23 55.3	48.0	
9.5	43.4	21.4		8.2	0 7.0	2.5	A	9.5	54.5	55.2		9.0	55.9	49.4	A	9.5	24 31.7	28.6	
9.5	47.4	39.2		8.3	1 5.6	58.2		8.6	29 15.4	37.3		9.1	52 28.7	26.2		9.1	54.0	28.4	A
9.0	37 25.6	39.2		9.4	39.7	20.9		9.2	21.8	37.3		8.4	33.1	19.5	B	8.3	25 7.3	19.4	A
8.5	38.2	29.8		9.2	2 23.3	3.3	B	9.2	32.3	3.6		9.0	53 21.4	38.5		9.3	32.0	42.1	
9.5	38 6.9	54.8		8.0	30.7	29.0	A	8.6	39.8	8.6	A	9.5	57.8	16.9		9.5	36.4	54.3	
9.4	20.7	57.3		9.1	57.9	22.7		9.2	40.1	13.7		9.5	55 2.1	53.0	B	9.2	59.0	9.8	
8.1	39.2	47.2	B	9.1	3 30.7	7.5		9.2	30 43.7	46.7		9.2	39.4	16.9		9.0	59.1	1.6	B
9.5	49.9	31.8		9.2	52.2	0.2		9.2	50.9	56.1	B	7.5	56.4	40.8	A	9.5	26 5.2	41.1	
8.7	39 36.4	1.7		9.5	4 1.6	38.3		8.8	31 8.8	7.2		9.2	56 21.8	18.9		9.5	19.0	12.2	
9.5	56.6	38.2		9.5	32.7	41.0		8.5	57.9	52.3		9.3	35.1	14.3		9.1	40.3	47.3	
9.5	40 6.2	48.9		9.5	38.9	59.1		9.3	58.8	45.5		8.9	50.7	42.4	A	6.4	27 6.0	5.4	A
8.5	23.8	18.0		7.5	6 9.8	31.7	A	7.4	32 9.8	31.7	A	9.0	57 29.6	31.1		9.0	15.3	42.1	
9.3	32.7	38.3	B	9.0	18.7	8.7		9.0	54.9	27.9	A	8.9	32.8	58.6		9.1	23.2	56.2	A
9.2	42.3	39.3		9.5	20.3	42.5		9.2	33 20.3	58.3		9.1	53.5	5.5		8.8	29 43.0	49.6	
9.0	41 2.6	28.9		8.0	7 18.0	12.6	A	9.3	20.9	10.2		9.0	58 52.0	53.6		8.6	30 44.0	23.0	
9.5	42 18.4	35.2		8.2	44.2	41.5	A	9.5	37.9	52.3		9.3	59 44.5	0.3		9.5	54.7	33.2	
9.2	43 51.8	19.0		9.5	9 19.1	50.2		8.0	44.3	28.9	A	9.5	1 2.6	44.5	B	9.2	31 37.8	25.2	A
9.5	59.0	50.2		9.1	37.5	0.2		8.8	34 23.8	33.7	A	8.5	13.4	26.3	A	9.2	50.0	6.2	
9.2	45 8.1	59.7		8.6	42.9	12.0	A	9.4	30.4	36.2		9.0	48.8	52.2	A	9.3	32 17.0	0.7	A
9.3	29.4	48.0		8.3	59.3	24.2	A	9.5	33.0	23.9		9.5	2 20.3	14.4		9.3	23.6	33.2	
6.5	56.6	0.0	A	9.5	10 28.4	15.9		8.4	40.2	15.1	A	9.5	29.2	55.6		9.3	33 16.9	43.3	
9.5	46 1.0	48.0		9.0	11 34.3	22.3	A	8.4	35 7.3	31.3	A	9.5	3 3.2	1.7		9.3	17.5	52.9	
9.1	20.1	11.6		8.8	12 2.3	13.5	A	9.5	38.4	9.3		9.5	14.8	58.6		9.5	27.5	4.8	
9.1	32.7	57.9		9.5	27.0	52.8		9.1	36 41.6	3.0		9.5	4 4.7	10.8		7.8	34 8.2	4.6	A
9.1	47 34.4	26.9		9.5	13 37.0	13.5		9.4	37 3.8	7.0	B	9.2	11.2	20.3		9.3	40.2	19.7	
6.0	48 7.7	54.3	A	6.0	44.3	21.3	A	9.5	13.4	11.0		9.5	30.0	20.8		9.1	35 40.3	22.1	
8.5	10.1	37.2		9.5	47.7	14.1	B	8.8	38 18.8	50.9	A	9.3	5 35.3	8.0	A	9.0	36 30.1	26.5	
9.0	36.2	13.0		9.3	58.9	45.6		9.5	48.0	0.8		9.5	6 52.8	52.6		9.1	34.2	24.0	
9.0	49 5.4	58.3	A	9.2	15 8.5	9.7	A	8.3	39 50.7	13.1	A	9.4	7 7.0	7.9	A	9.3	36.1	38.5	
8.3	22.6	57.3	A	8.7	19.4	1.2	A	9.0	41 12.4	38.6		5.3	31.2	42.4	A	9.5	52.4	19.0	
9.2	42.9	21.0		8.5	24.4	31.3		9.5	16.1	5.0		8.7	42.8	4.2	A	7.5	37 28.9	42.9	A
9.3	50.4	18.0		9.5	26.2	48.3		9.3	28.5	49.3		9.5	8 16.8	4.5		8.4	38 3.8	9.3	A
8.8	53.0	58.3	A	9.4	38.6	31.5		9.0	40.4	46.8		8.4	26.5	55.1	A	9.5	34.7	53.8	
8.1	50 7.6	28.6	B	9.5	17 29.9	15.9		7.7	58.5	41.5	A	9.5	55.3	50.2		9.4	39 41.2	53.3	
9.3	12.6	17.0		8.7	40.4	48.4		9.0	42 10.9	25.5	A	9.5	10 6.8	24.8		9.5	56.5	33.5	
9.1	22.9	7.2		9.4	51.8	31.2		9.1	43 5.7	38.6	B	9.5	11.5	31.3	B	9.1	42 29.8	8.2	A
9.0	40.6	15.5		9.0	18 43.3	50.8		9.5	7.4	45.5		9.5	11 23.7	45.8		8.6	43 29.3	1.1	B
9.1	55.4	7.9		9.3	43.3	51.9		9.5	16.7	48.7		9.2	14 14.2	9.5		8.7	50.1	8.4	B
6.0	51 34.6	52.3	A	9.5	19 29.4	28.2		9.5	18.7	46.8		8.3	17.1	56.1	A	9.2	44 15.0	36.0	
9.5	52 36.2	23.8		9.4	54.9	41.0		9.5	21.9	53.4		9.0	39.5	46.3		9.3	30.0	6.5	
8.8	57.7	53.3	A	9.5	59.7	59.0		9.5	29.6	44.8		4.5	15 47.6	30.1	A	8.8	32.4	3.8	A
8.8	53 29.5	50.9	A	8.9	20 4.8	32.7		9.5	30.5	58.5		9.0	53.0	27.2	A	8.8	45 1.2	39.5	A
9.1	41.6	37.3		9.4	20.8	13.9		9.5	31.5	55.7		9.0	16 44.2	57.1		9.4	39.0	11.2	
9.5	54 16.3	32.3		8.3	37.4	32.6		9.2	33.0	8.3	B	9.0	48.2	43.8		9.5	48.0	45.3	
8.8	53.0	57.6		9.4	21 40.2	50.9		9.5	40.7	54.9		9.0	18 4.5	56.6		8.5	59.2	56.8	A
9.5	55 25.8	30.5	B	9.5	42.5	10.3		7.0	44.9	4.2	A	9.5	29.4	10.9		9.4	59.6	55.6	
8.5	28.7	52.3	A	8.8	22 5.9	41.0		9.4	44 38.9	44.5		9.2	54.5	42.4	A	9.5	46 33.0	42.9	
9.1	38.2	0.9		8.9	46.8	37.1		9.1	57.8	21.4		6.0	57.5	57.4	G	9.5	44.8	50.8	
9.2	46.7	16.9	A	8.8	56.8	56.2		9.5	45 28.6	48.6		8.5	19 0.8	28.2	A	9.5	57.7	54.6	
8.3	52.6	57.6	A	9.5	23 36.2	8.8		8.5	46 25.4	22.3		8.3	25.3	31.9	A	9.5	48 2.5	10.8	
9.3	56 55.3	6.2		9.5	36.8	44.9		9.3	28.9	24.7		7.5	40.0	10.2	A	8.0	10.0	53.7	A
8.0	57 8.6	28.7	A	9.4	24 10.7	22.3		9.4	52.0	20.4		9.4	53.8	1.1		7.3	19.0	0.3	L
8.7	17.0	57.2	B	9.5	23.3	12.5		9.5	47 34.9	32.2		9.5	20 47.0	38.5		8.0	58.8	53.7	A
9.2	19.8	40.0	B	7.5	36.3	58.7	A	9.5	36.0	23.2		9.5	49.7	50.9		8.8	49 56.5	47.8	
8.3	50.7	7.1	A	8.8	48.8	45.4	A	9.4	48 55.1	3.0		9.1	21 13.5	0.8	A	9.0	50 4.5	41.9	
9.3	58 18.5	37.1		9.5	26 11.0	15.9		9.2	49 25.9	4.5		9.2	42.6	48.0		8.1	53 3.4	0.7	B
7.9	32.0	4.1	A	9.1	42.0	39.9		9.0	26.2	34.8	B	9.2	56.5	34.0		8.8	24.5	41.9	
9.2	36.2	18.0		9.2	27 9.8	17.7		9.5	53.4	39.0		9.5	22 20.1	51.8		9.0	38.5	24.6	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	7ᵘ—8ᵘ	+49°			8ᵘ—9ᵘ	+49°			9ᵘ	+49°			9ᵘ—10ᵘ	+49°			10ᵘ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	54 9.0	36.0		9.3	34 39.5	32.7	B	8.4	8 30.3	32.0	A	9.4	40 9.5	31.8		9.4	10 45.5	29.8	
9.5	34.6	5.4		9.5	42.6	56.7		9.5	34.3	44.8		9.3	10.3	54.3	A	9.2	11 8.4	59.5	B
8.9	56 40.1	58.8		9.2	58.2	48.0	B	9.0	9 18.9	11.2	A	9.0	33.4	37.2		9.4	13.8	50.2	
9.3	53.2	23.5		9.4	35 25.6	28.7		8.8	51.1	28.8	A	9.4	34.8	7.0		9.5	23.6	39.5	
7.6	57 27.3	40.7	R	9.0	30.3	36.4	A	9.2	10 25.9	11.0		7.5	36.3	44.7	A	9.5	27.6	4.2	
6.8	47.0	26.3	A	7.5	31.3	23.1	L	9.2	28.4	1.3	B	9.5	41 44.0	19.3		9.1	30.7	19.9	A
9.5	58 20.2	19.0		9.5	43.4	13.7		8.9	34.8	56.2	A	9.5	44.8	28.7		9.3	36.3	49.6	B
9.3	0 35.2	30.3	A	8.5	36 11.3	38.5	A	9.1	45.4	30.8	A	9.5	42 11.9	34.8		9.4	42.8	47.6	
9.3	1 17.5	0.4		9.5	30.8	59.2		9.5	47.7	0.3		7.6	50.1	52.2	B	9.5	12 7.6	19.6	B
9.3	30.2	44.1		9.0	59.8	35.5	A	9.5	51.0	3.8		9.5	57.2	19.3		9.4	13 0.7	7.4	
7.0	36.7	23.3	A	8.4	38 7.3	30.5	A	8.0	11 1.3	12.7	B	9.4	43 40.9	13.3		8.9	2.9	1.9	
8.8	2 43.7	40.7	A	7.9	28.8	58.2	A	8.5	9.4	43.2	A	9.0	46.4	5.1		9.5	31.2	41.0	
9.5	3 25.3	50.6		9.5	45.9	33.0		7.3	12 35.1	1.5	A	9.0	44 16.5	9.0	B	9.2	38.0	44.3	
9.5	56.8	36.8		9.3	39 0.8	59.8	B	9.4	13 31.4	17.9		8.4	45 5.0	2.4	A	9.2	14 16.8	26.4	
9.5	4 15.3	34.2		9.0	25.4	59.2	A	9.5	14 46.2	3.5		9.1	8.2	27.8	A	8.0	52.2	50.2	A
9.0	16.0	16.5	A	8.2	40 26.6	52.7	A	9.3	15 24.6	30.8		7.8	46 12.5	8.7	A	9.5	15 27.1	24.9	
9.0	5 17.3	34.8		9.3	30.7	2.4		9.3	49.9	2.8		9.5	54.1	53.9		8.8	55.5	54.7	A
9.1	6 13.2	56.5		8.9	41 5.2	6.5	A	9.1	16 6.8	33.8	A	9.5	47 3.2	5.9		8.4	18 32.6	6.9	A
8.7	26.3	0.4	A	9.1	42 49.8	15.1		9.5	17 26.3	54.2		9.3	35.5	19.1		8.8	52.2	26.4	A
9.5	56.9	11.5		9.4	43 30.3	56.7		9.5	28.5	17.2		9.5	35.8	28.1		6.6	19 6.2	42.2	A
8.4	7 35.8	39.2		9.1	44 7.1	23.6	A	8.0	18 32.8	30.7	A	9.4	48 50.8	7.6	B	6.2	6.7	32.8	A
9.5	44.5	22.8		9.1	25.8	52.7		9.5	20 37.3	4.5		9.3	49 10.0	10.6		9.5	24.3	53.7	
8.0	8 28.2	53.5	A	9.5	45 6.9	36.4		9.5	53.4	33.2		8.8	51 16.5	46.0	A	9.5	20 43.2	19.4	
9.2	43.6	3.9	B	7.8	41.1	38.5	A	9.3	22 14.8	11.8		9.5	32.6	30.6		9.5	22 33.8	30.8	
9.2	45.3	22.5		8.0	47 12.3	2.1	A	9.3	14.9	5.8		9.0	53 31.5	47.5		8.8	24 14.7	54.7	A
9.3	9 1.7	2.7		8.8	14.3	10.8	A	9.5	23 25.9	35.4	B	8.9	41.6	13.6		7.0	55.0	54.7	A
9.5	10 26.3	10.1		8.4	21.4	25.1	A	9.5	24 34.5	40.8		8.2	53.4	54.1	B	9.4	25 21.9	9.4	
9.0	11 8.2	28.3		9.3	46.5	48.9	B	8.0	50.3	23.8	A	9.5	54 4.1	57.0		6.9	30.4	50.2	A
8.0	53.3	56.0	A	9.4	48 11.2	23.2	B	9.5	25 23.2	23.3		7.2	52.2	17.4	B	9.3	45.3	0.5	
9.2	12 2.5	52.7	B	8.9	49 47.3	15.0		7.0	26 11.9	7.8	G	9.4	56.7	2.6		9.0	26 30.8	23.4	
9.3	59.3	42.7		8.9	50 24.6	5.5	A	9.1	20.0	3.5		9.5	55 24.9	47.3		9.3	27 3.2	18.4	A
8.4	14 20.0	20.4	A	9.3	26.3	36.3	B	9.2	27 19.8	26.8		9.2	30.0	37.8	B	9.2	33.0	48.7	A
8.5	30.8	1.1	A	9.5	34.3	13.9		8.7	45.3	56.2	A	8.8	42.4	44.3	B	8.5	59.3	53.2	A
9.0	16 53.5	0.1		9.2	51 10.3	27.8		8.8	56.7	8.4	A	9.2	56 15.0	28.6		8.5	28 8.4	2.7	A
9.5	17 30.2	17.5		9.2	14.8	16.3		8.7	28 15.7	38.8	A	9.5	29.6	3.6		8.7	8.4	10.0	A
9.5	19 38.6	37.2		9.5	52 46.0	38.7		8.9	19.7	58.2	A	9.5	57 16.5	6.1		8.8	11.9	26.4	A
8.7	57.2	1.4		8.4	53 15.8	37.4	B	9.2	36.9	4.2		8.9	32.7	37.4	B	8.2	29 50.7	57.6	A
9.5	20 7.8	27.8		9.0	29.7	36.3		9.5	29 29.4	53.6		9.1	44.3	14.2		9.5	30 25.3	1.7	
9.0	31.5	48.3	A	9.4	54 27.8	53.1	B	9.5	56.5	7.2	B	9.1	45.0	9.5	A	9.5	33.0	57.2	
8.1	42.8	48.6	A	9.3	50.2	5.8	B	9.3	30 4.8	33.2		9.0	51.2	7.6	A	9.0	38.6	33.8	A
9.5	21 2.8	51.6		6.5	55 24.7	6.2	G	8.3	24.8	46.2	A	9.0	52.6	56.5		8.0	32 17.0	44.3	A
8.3	22 47.7	45.1	B	9.5	56 11.9	15.9		9.0	31 15.9	54.7	A	8.6	58 18.0	33.7	A	7.6	18.1	19.9	A
6.5	24 35.8	1.7	L	9.5	52.8	14.8		9.5	38.1	47.7		8.6	0 37.0	19.7	A	9.2	30.6	22.9	
9.5	25 7.0	7.5		9.1	57 18.8	36.7		9.4	50.8	17.9		9.5	46.5	13.6		9.4	33 40.4	57.7	
7.5	9.1	44.1	A	9.3	30.2	23.9		9.1	32 21.8	14.5	B	9.5	1 11.3	51.0		9.0	35 23.8	19.4	A
9.5	27.2	28.3		9.5	56.3	20.7		9.4	27.3	18.3		9.2	3 15.0	48.3		7.3	36 14.2	17.9	A
9.3	33.8	21.5		9.4	58 9.2	24.5	B	7.0	50.6	26.3	A	9.5	16.8	34.8		9.3	39 1.1	21.6	B
9.4	26 4.2	54.0		9.2	47.0	53.6	A	6.5	33 9.2	4.8	A	9.0	21.8	44.3		9.3	7.3	38.3	
9.4	7.9	4.4		7.5	54.8	53.6	A	9.5	34 26.3	26.9	B	9.1	28.7	7.1	B	9.5	45.8	51.2	
7.3	17.4	52.5	A	8.5	59 23.8	31.8	A	9.5	29.4	56.6		9.2	31.5	14.6		9.4	40 44.3	50.2	
9.3	54.8	37.8		9.5	45.5	44.7		8.9	36.1	41.2	A	9.0	46.7	18.1	B	8.6	41 9		
9.4	59.0	52.5		9.3	55.5	42.7	A	9.1	39.3	27.0	B	8.5	4 54.5	31.2	A	9.4			
9.0	27 27.2	43.1	A	9.5	1 45.0	0.8		9.5	58.8	9.2	B	8.3	7 3.3	28.3	A	9.5	42		
9.2	29 11.3	52.5		9.5	2 18.9	13.3		9.5	35 0.2	8.7		9.5	49.5	33.3		9.5			
9.5	19.2	1.9		7.7	28.8	47.7	A	9.1	14.6	28.0		9.5	8 29.8	53.7		9.5	44		
9.5	30 2.0	36.2		9.5	4 3.4	34.8		8.5	20.4	15.8	A	8.7	34.6	47.7	A	9.2			
9.0	32 14.3	11.6	A	9.5	5 10.1	13.9		9.4	36 7.6	46.2		8.8	9 40.8	56.1	A	9.5			
8.3	41.4	48.8	A	7.9	6 18.6	32.8	A	9.3	37 27.5	3.5		9.4	42.6	22.6	B	9.5			
6.8	33 7.4	23.5	A	9.5	7 2.1	26.8		9.3	38 28.4	25.4	A	8.5	52.4	20.5	B	9.5			
9.0	34 17.8	43.4		8.7	7.9	18.9	A	8.0	31.3	43.2	A	6.0	10 24.9	7.5	B	9.[illegible]			

2061—2120				2121—2180				2181—2240				2241—2300			
	11ᵐ—12ᵐ	+49°			12ᵐ	+49°			12ᵐ—13ᵐ	+49°			13ᵐ—14ᵐ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.0	22 31.6	43.7	A	9.0	3 58.3	18.3		9.5	54 22.3	47.4		9.3	38 26.9	40.4	
6.5	23 13.8	34.7	A	9.5	4 48.6	1.9		9.3	57 21.4	35.0		9.5	44.0	3.0	
8.5	20.3	43.2	A	8.3	5 24.5	23.8	A	9.1	58 3.8	8.3	A	9.4	39 54.4	53.8	
9.0	24 6.1	35.8	A	9.5	6 54.8	43.2		9.0	30.3	22.2	A	8.6	40 43.1	17.0	
9.4	25 5.8	32.2		9.5	7 14.2	6.6		8.5	43.9	24.4	A	7.5	42 48.8	4.6	A
8.1	26 12.6	21.3	A	9.5	55.8	31.7		9.2	44.9	22.5	B	9.2	59.1	18.1	B
8.5	41.5	19.3	A	9.5	8 44.3	12.4		8.9	59 40.0	11.5	A	9.1	45 37.5	22.6	
8.9	58.3	53.3		7.8	9 51.4	14.0	A	9.3	0 59.6	9.2	A	9.5	46 0.0	2.8	
9.5	27 19.5	47.1		9.0	12 2.9	45.6		9.3	1 10.9	18.1		9.0	21.7	42.1	
9.4	20.3	11.8	B	5.7	40.1	47.0	A	9.2	12.5	24.2	B	9.2	47 31.5	48.5	
8.7	26.2	15.6	B	9.1	14 38.8	4.5		9.5	24.6	51.6		7.7	50 33.2	3.8	A
9.5	36.2	7.3	B	7.3	15 28.6	9.5	A	9.5	39.6	53.1	B	8.5	46.0	57.0	
9.3	29 26.0	9.0		9.0	40.3	21.4	A	9.2	51.2	17.1	B	7.0	49.2	43.1	A
9.2	31 23.3	57.4	A	9.1	55.5	1.8	A	9.3	4 12.5	44.9	A	9.5	52 1.5	49.5	
9.5	52.4	36.1		8.4	58.3	39.8	A	8.9	5 11.9	27.5	A	8.9	35.9	35.5	
8.5	32 35.4	2.4	B	9.5	17 0.9	19.9		9.5	19.4	13.5	B	7.9	53 9.8	57.1	B
9.3	33 10.6	52.2	A	9.4	53.5	55.7	A	9.5	27.0	48.9		9.2	20.1	36.4	B
9.2	34 13.2	6.9	A	7.7	18 25.6	10.4	A	9.5	45.5	31.5		9.5	37.1	41.4	
7.6	36 45.0	19.2	B	7.5	19 46.1	27.9	B	9.3	6 38.6	13.0	A	7.4	56.1	15.2	B
9.5	37 15.8	40.2		9.5	20 15.3	35.4		8.8	7 43.9	58.8	A	9.3	55 30.5	38.1	
9.5	47.4	7.4		8.5	21 34.6	5.1		9.2	55.4	3.6		9.5	58.7	23.2	
9.5	38 31.9	47.7		9.3	48.8	25.3	B	9.2	8 4.4	38.4	A	9.5	56 22.5	40.6	
9.0	39 20.5	52.6		8.5	22 3.3	43.7	A	8.8	36.0	58.8	A	9.0	25.5	15.7	
9.5	33.3	22.3		8.6	19.2	50.7	A	9.0	57.4	24.5	A	8.5	57 44.0	41.6	A
9.5	36.8	55.0		9.5	24 30.3	35.8		9.0	9 36.4	36.9	A	8.5	47.9	15.1	
8.3	40 36.2	19.8	A	9.2	32.0	4.5	A	9.4	55.5	15.0		9.5	58 58.4	2.5	
neb	54.0	31.0		9.1	39.8	8.8	A	8.5	12 11.9	7.1	A	9.5	59 39.0	53.4	
9.3	42 33.9	11.7	B	9.5	42.7	12.0	B	8.5	12.1	40.2	A	9.1	43.4	14.7	
8.9	44 37.6	1.6	A	9.4	25 15.6	4.5		9.1	13 42.8	2.9	A	7.5	0 50.5	33.1	A
8.9	45 54.8	56.1	A	9.5	26 9.4	10.9	B	9.5	17 9.5	6.5		9.5	2 0.0	48.0	
9.5	46 18.9	5.6		8.0	29 15.8	58.2	A	9.3	18 13.4	2.3		9.3	0.7	42.6	B
7.5	47 8.8	43.2	A	9.0	30 9.8	19.4	A	9.0	13.6	37.9	A	8.5	22.7	24.2	A
9.5	22.4	12.8		9.0	33 5.8	36.9	A	9.2	20 48.4	21.5		9.3	3 4.6	37.0	
9.5	48 5.8	2.6		9.2	34 1.9	8.8	A	9.2	21 2.1	49.9	B	9.0	14.7	11.6	S
9.5	33.9	47.7		9.1	35 25.8	27.6		9.4	18.9	29.5		9.4	20.6	41.8	B
9.5	49 17.8	25.8		8.8	36 23.2	13.2	A	9.3	43.4	26.0		9.3	59.9	10.6	
9.4	34.0	56.6		9.4	37 50.9	35.5	A	9.5	22 30.3	2.4		9.4	4 2.0	48.5	
8.0	50 32.9	1.1	A	9.0	38 5.7	45.4	A	9.3	23 13.8	31.6	B	9.0	15.5	11.2	A
9.5	52 17.7	2.0		9.1	14.8	3.6	A	9.5	19.3	37.6		9.1	42.4	59.0	
9.1	34.8	41.2	A	9.5	39 20.3	1.5		9.5	22.2	8.9		9.4	5 4.9	4.1	
9.2	41.0	41.8	A	9.3	40.0	39.4	A	9.3	26 23.9	36.9	A	9.4	7 3.5	13.7	
9.2	58.6	57.5	A	9.5	41 51.0	6.1	B	9.1	39.5	55.8	A	9.1	15.9	48.5	
9.3	53 6.7	57.5		6.0	42 2.6	16.0	A	7.7	53.4	52.8	A	9.4	8 25.3	12.8	
9.5	16.2	24.8		8.9	57.5	2.5		9.5	27 38.4	47.9		8.8	10 4.0	31.1	A
9.5	48.6	44.3		6.5	59.1	32.9	A	9.5	45.4	55.3		9.1	11 29.4	52.0	
9.3	54 1.4	14.8		9.4	43 11.6	1.5		9.1	28 0.7	30.5		9.1	12 24.6	25.7	B
9.5	56 48.5	36.2		9.4	12.4	26.0		4.8	32.5	45.8	A	8.8	26.2	25.4	B
8.5	57 46.9	23.8	A	9.3	44 12.0	43.4		8.8	29 8.4	27.5		9.4	29.3	22.1	
9.5	58.2	19.8		9.1	28.0	29.5	A	9.5	30.4	52.8		9.5	13 26.4	52.5	
7.0	58 45.3	57.7	A	8.9	30.8	3.3	A	9.4	52.4	39.4		6.5	30.4	15.7	A
9.5	59 9.8	2.8		8.4	45 36.2	8.6	A	9.1	30 27.5	37.9	A	8.0	14 36.7	57.5	R
8.3	39.3	21.3	A	9.0	46 39.5	50.3	A	9.5	31 35.3	33.5	B	9.5	40.5	22.6	
9.5	0 14.8	1.8		9.5	48 9.0	44.9		9.5	51.4	45.4		9.2	46.4	0.8	A
9.1	40.8	45.9		8.7	27.7	1.0	A	9.5	32 30.6	32.4		7.3	59.6	10.7	A
7.5	1 6.7	46.6	A	8.4	51 33.9	2.3		9.5	33 16.3	15.5		9.5	15 13.5	21.2	
7.3	33.8	59.6	A	9.3	36.0	57.9		8.8	51.7	2.9		9.0	16 47.0	22.7	
9.5	2 10.9	41.1		8.8	52 15.7	23.0	A	9.5	36 11.4	15.5		9.5	47.9	58.6	B
8.3	53.8	20.5	A	9.5	37.0	18.0		9.3	37 6.5	52.8		8.9	56.0	11.2	A
9.5	3 32.7	21.3		9.5	56.4	47.4		9.0	38 5.3	52.3		8.5	19 21.4	55.5	A
8.8	55.9	6.0		8.8	59.8	55.4		9.5	5.9	24.0		9.5	52.3	53.4	

2301—2360			
	14h—15h	+49°	
m	′ ″	′	
9.4	22 28.5	18.7	
8.9	56.0	53.5	
9.5	23 45.5	35.6	
9.0	24 26.0	11.6	A
7.8	33.4	32.1	A
9.5	25 21.0	42.5	
9.0	41.9	54.0	A
7.0	27 23.0	49.5	A
9.4	29 39.6	32.1	
9.5	32 4.5	36.7	
9.5	9.0	33.2	
9.4	45.3	3.2	
9.0	33 28.8	12.7	B
9.1	50.5	7.9	
9.4	34 17.7	38.0	B
9.0	19.7	18.9	A
7.9	35 13.8	19.9	B
9.2	36 15.5	36.7	
7.8	37 10.0	43.7	A
8.5	38 37.6	35.2	A
9.4	42 4.5	2.2	
9.3	17.3	6.5	
9.5	59.1	20.8	
8.9	44 7.0	16.2	
8.6	44.6	7.9	
5.8	47.1	19.6	A
8.0	46 54.0	41.7	A
7.3	47 27.5	16.3	A
9.0	42.5	8.3	A
7.8	58.8	3.6	A
9.5	48 3.0	28.3	
8.8	16.0	43.7	
8.9	47.5	47.6	
9.5	49 19.5	15.8	
9.3	38.8	41.2	
9.3	50 26.0	21.8	
8.6	41.0	41.7	A
9.3	58.3	48.7	
9.0	51 6.7	39.2	A
9.5	52 6.5	57.1	
9.3	58.8	41.7	
9.3	53 8.0	10.8	
9.5	54 0.5	57.6	
8.8	34.8	14.3	A
9.5	55 55.7	57.1	
9.4	56 3.9	44.9	
9.4	8.5	38.2	
7.0	41.1	45.2	A
9.5	57 14.6	13.3	
9.1	58 56.9	2.4	A
8.8	59 11.2	32.3	
9.5	24.3	18.4	
8.8	54.6	22.4	
8.6	55.6	9.7	A
9.5	0 5.7	35.8	
9.0	2 58.2	37.2	
9.4	3 31.7	22.2	B
8.5	4 20.6	53.7	A
9.1	21.4	16.9	
9.4	5 1.7	22.8	

2361—2420			
	15h	+49°	
m	′ ″	′	
7.5	6 45.2	13.9	A
8.3	56.1	27.3	A
7.0	8 3.1	7.3	A
9.5	43.3	31.8	
9.5	56.2	52.1	
9.3	9 27.9	30.8	
9.5	10 0.0	45.7	
9.4	27.2	23.3	
9.5	57.6	35.8	
8.8	11 3.9	27.3	
9.5	5.2	49.2	
9.4	12 19.8	31.3	
8.5	13 35.7	49.2	A
8.3	51.3	10.3	A
8.3	14 16.4	19.4	
8.1	31.6	8.0	A
9.5	50.5	19.4	
8.8	15 3.2	54.2	A
9.4	10.6	10.8	
9.3	44.2	38.3	
9.3	16 19.3	6.0	
9.2	18 36.9	9.2	
8.4	19 32.6	16.4	A
9.5	20 46.8	5.6	
9.4	21 49.7	42.7	
9.5	22 24.6	0.7	
9.5	23 2.1	21.3	B
9.0	49.7	59.7	
9.0	24 8.4	59.7	
9.1	30.3	50.7	
9.5	25 6.7	12.8	
8.8	11.6	5.0	A
9.1	22.8	58.7	
9.0	24.6	36.3	
9.3	26.5	11.4	B
9.3	38.4	7.4	
9.5	53.9	2.5	
8.8	26 46.7	19.4	
9.0	55.6	25.8	
9.1	27 37.1	6.0	
9.4	28 4.9	24.3	
9.5	20.4	38.7	
8.9	26.8	31.8	
9.5	29 3.0	1.3	
9.5	5.3	37.2	
9.3	30 41.9	41.7	
9.4	31 31.0	40.0	
8.0	40.2	16.9	A
8.7	52.1	43.5	
8.9	58.4	19.4	
9.3	32 17.8	24.3	
8.5	50.7	40.8	
8.8	51.4	9.6	
9.5	34 27.6	29.8	
9.1	36 2.9	37.9	B
9.5	29.4	7.5	
8.1	37 30.5	54.8	A
9.2	38 2.9	0.7	
8.5	40 18.9	29.4	A
9.5	40.0	22.9	

2421—2480			
	15h—16h	+49°	
m	′ ″	′	
9.4	40 55.4	32.8	
9.5	56.1	34.9	
9.5	41 49.4	10.5	
9.2	42 13.4	36.9	
9.0	52.9	46.8	
9.5	43 47.3	13.5	
9.5	44 31.6	23.9	
8.5	39.2	7.7	A
9.5	45 34.4	3.5	
8.4	46 15.3	41.3	A
9.5	48 58.7	53.3	
9.5	49 51.6	13.0	
9.1	50 12.3	51.3	
9.1	22.4	48.3	
8.7	52 34.4	26.5	A
9.5	46.5	37.9	
9.2	47.1	40.8	
9.2	56.2	13.3	B
9.5	53 17.3	45.4	
9.1	48.4	54.0	
8.5	57.4	35.4	
8.6	54 14.1	14.0	A
8.9	16.1	23.4	
8.8	30.2	17.5	A
9.5	55 8.3	6.0	
8.5	56 6.4	31.1	A
9.5	13.5	24.9	
9.0	37.6	55.8	
9.0	45.9	42.3	
9.5	57 25.3	27.9	
9.5	59 8.2	35.8	
9.0	50.9	21.0	
9.5	0 7.0	39.8	
9.5	10.4	13.5	
9.3	55.3	59.8	
8.6	1 8.5	8.2	B
9.5	48.8	23.9	
9.4	55.3	8.4	
9.3	2 42.4	45.3	
9.5	54.5	16.6	
7.2	3 1.2	28.9	A
9.5	10.4	5.5	
9.2	36.8	23.6	
8.6	42.8	16.6	A
9.5	4 30.9	54.4	
9.0	5 5.4	44.0	
9.2	8.4	10.5	A
9.5	26.3	23.6	
7.0	6 7.7	0.2	A
8.8	21.8	24.5	A
7.8	51.9	26.5	A
8.5	7 0.3	48.5	
9.4	26.2	18.9	
9.5	29.8	59.4	
9.3	34.8	12.4	B
8.4	8 30.3	49.9	A
9.5	9 3.4	27.1	
9.5	16.2	1.1	
9.3	26.9	38.0	
9.4	53.3	49.5	

2481—2540			
	16h	+49°	
m	′ ″	′	
9.4	10 1.7	35.1	B
9.4	53.8	9.6	
9.5	11 11.5	31.6	
9.5	29.8	59.4	
9.5	12 6.2	9.5	
9.5	7.5	46.5	B
9.5	8.7	2.8	
9.1	42.4	51.4	
8.9	13 41.8	39.5	
8.6	15 3.4	35.0	
6.0	8.8	23.0	A
9.1	16 2.9	50.9	
8.0	16.5	24.2	A
8.8	32.7	1.2	
9.1	41.4	30.0	A
9.0	17 11.9	14.1	A
9.1	25.3	52.4	
9.1	18 28.3	51.9	A
8.9	31.4	56.4	A
9.2	19 27.6	29.5	
9.5	20 43.4	52.4	
9.5	21 3.2	20.6	
9.5	46.5	41.5	
8.7	22 10.2	0.5	A
9.4	21.5	18.1	
9.5	23 12.6	31.0	
9.5	22.2	13.1	B
9.5	24 26.1	59.1	B
9.1	35.7	17.5	B
8.7	39.6	44.9	A
9.5	48.4	44.9	
8.0	55.7	17.7	B
8.5	25 25.4	35.5	A
5.8	26 7.9	17.6	G
9.2	19.9	7.8	
8.7	49.8	31.0	A
9.5	49.9	41.0	
9.0	27 5.9	32.0	A
9.5	28 3.3	18.1	
9.5	29 56.1	47.5	
9.5	30 2.8	10.8	
9.0	7.9	2.4	B
8.8	14.4	31.5	
9.4	31 9.3	42.0	
8.7	33.6	22.5	
9.0	32 32.1	13.6	
9.5	33 15.4	40.0	
9.3	37.3	7.2	
9.5	34 28.8	24.0	
7.3	37.3	8.8	-
5.0	49.7		
9.5	35 18.[illegible]		
8.9	56.[illegible]		
9.4	36 19.[illegible]		
8.6	[illegible]		
9.1			
8.8			
9.5	3[illegible]		
9.3			
8.8			

2541—2600			
	16h—17h	+49°	
m	′ ″	′	
9.3	40 5.6	21.5	
9.5	28.0	32.5	
9.5	41 5.9	45.5	
9.5	42 1.1	3.8	
8.5	7.4	25.1	
9.1	41.9	42.0	
8.5	59.8	20.1	A
8.8	43 3.8	27.1	A
8.9	6.1	18.6	A
9.5	50.9	22.1	
9.5	44 6.4	30.5	
9.1	45 24.3	17.6	
9.5	31.5	54.4	
9.5	58.0	33.2	B
9.5	46 30.2	41.0	
9.3	47 56.9	39.5	
9.5	48 6.1	4.1	
9.5	31.8	39.0	
9.3	40.1	47.0	
9.3	42.7	37.9	B
9.1	49 29.8	20.6	
9.3	32.1	0.5	
9.5	58.3	56.8	
9.5	51 18.8	47.5	
9.1	23.7	35.5	A
9.5	52 53.3	39.5	
9.3	53 31.2	18.5	
9.0	33.1	1.0	
8.4	50.3	23.0	B
9.4	51.0	53.1	B
8.4	53.3	48.7	
9.1	54 59.1	8.3	
9.5	56 1.0	31.7	
7.3	27.9	41.2	A
8.0	57 11.6	9.3	A
9.3	48.6	16.8	
9.4	58 21.6	33.2	
8.8	28.5	37.6	
6.8	31.1	48.6	A
9.3	40.0	33.6	
8.7	0 46.2	1.9	
9.1	56.3	56.1	A
5.8	59.9	1.0	A
9.0	1 23.6	51.1	A
9.5	2 29.7	15.9	A
8.5	48.6	23.3	A
9.5	4 59.9	6.4	
8.6	5 0.6	56.6	S
9.4	2.7	24.3	B
8.3	6 0.1	52.6	A
	1.2	26.4	A
	2.3	39.7	
	[illegible]	59.3	
		18.3	
		3	A
		[illegible]	L
			B
		3	
		1	A
			B

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	17ʰ	+49°			17ʰ	+49°			17ʰ—18ʰ	+49°			18ʰ	+49°			18ʰ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	7 46.4	1.2	A	9.1	30 5.4	47.5	A	8.0	59 14.8	56.6	A	9.5	17 48.4	14.4		9.5	37 36.2	15.2	
8.5	51.6	52.1	A	8.5	40.8	18.5	L	9.0	48.3	11.8		5.1	50.8	2.6	A	9.5	39.5	53.5	
9.3	54.3	1.4		9.2	49.5	55.0		9.1	0 26.3	11.1		8.1	18 23.1	29.9	A	9.0	58.7	41.6	
6.2	58.6	55.6	A	9.0	31 5.4	48.0	A	9.0	29.9	15.6		9.5	49.9	32.4		7.3	38 25.7	14.7	A
9.3	8 7.6	25.2		9.5	16.1	33.5		9.4	37.0	57.2		8.0	19 38.7	53.6	A	9.3	31.5	46.0	
9.2	15.5	45.6		9.2	36.4	57.4		9.0	1 4.9	30.9	A	9.5	20 27.9	39.8		8.8	37.6	59.8	
9.3	9 6.8	10.7		9.5	32 26.3	40.5		7.5	47.6	20.5	A	9.5	31.5	57.5		7.4	39 4.0	18.1	B
9.0	27.9	45.1	A	7.0	37.6	32.9	A	7.3	2 28.2	28.0	A	9.2	55.3	12.5		9.5	10.3	11.5	
9.3	45.5	54.5	A	9.5	44.1	10.9		7.7	30.1	31.4	A	9.2	21 29.2	56.2	A	7.3	31.2	34.6	L
9.0	10 17.5	13.3	A	8.5	46.7	4.8	B	8.6	3 1.9	59.6	S	7.2	33.5	47.3	A	9.3	55.1	32.6	
9.1	12 8.5	34.6	A	9.3	53.1	25.6	B	8.5	17.6	48.4	A	9.0	37.3	29.4		9.5	58.5	41.1	
9.4	35.8	29.0	B	9.1	33 3.0	33.4	A	6.5	29.8	41.5	A	8.5	22 12.4	41.3	A	9.5	40 2.0	7.3	
8.5	41.4	44.1	A	9.0	32.8	46.0		9.4	49.8	31.0	B	9.5	31.9	0.0		8.8	21.8	44.1	A
7.2	13 7.0	52.1	A	8.5	34 52.6	42.5	A	9.5	4 3.9	19.6		9.5	35.6	10.6		9.5	48.3	47.6	
8.5	14 12.7	27.2	A	9.0	35 28.4	59.1		9.4	47.9	15.4	A	9.5	38.4	28.4		9.0	41 0.1	32.1	A
9.5	15 24.3	20.2		8.2	53.1	58.4	A	9.3	55.5	43.3	B	9.5	23 47.5	15.9		9.5	38.2	43.6	
9.0	34.8	26.3	A	9.2	36 9.2	40.3	B	9.4	5 10.8	46.5		7.7	49.2	43.3	A	9.2	43.5	15.6	
9.5	40.0	13.7		6.5	11.1	51.7	A	8.7	17.9	48.5	B	9.5	56.9	19.4		9.5	46.4	5.8	
9.0	16 39.0	41.6		9.5	21.6	42.3		9.4	24.5	48.9		9.4	24 5.3	3.3		9.0	58.0	5.5	
7.8	47.3	9.7	A	8.2	38 28.9	4.4	A	9.5	32.7	49.6		9.5	38.2	24.6		9.2	59.1	3.2	
9.1	50.4	13.2	A	9.0	53.8	41.0		9.5	41.6	50.3		9.5	25 31.9	19.2		8.8	42 3.8	22.2	A
9.5	52.5	37.6		8.3	39 52.7	56.1	A	9.5	6 26.8	36.0		9.2	56.7	47.5		9.4	6.5	36.7	
8.6	17 42.7	54.4	A	9.5	40 4.6	6.6		9.3	7 20.3	56.3		9.4	26 4.5	12.8		8.8	18.3	50.8	
9.5	18 21.9	40.5		9.4	9.0	52.1		8.9	28.1	30.0		9.5	8.9	52.8		9.5	52.1	1.8	
9.0	19 3.3	39.5	A	8.3	57.6	18.5	R	9.5	38.0	48.4		9.1	21.6	12.4		9.1	52.8	16.7	A
9.5	4.6	15.9		9.0	41 9.5	4.0		9.5	8 6.4	20.4		9.4	24.0	15.7		9.5	43 11.9	50.6	
9.5	25.0	20.1		8.8	13.9	10.7	R	9.4	14.9	51.7		9.5	32.7	26.7		8.9	26.4	0.3	
9.2	20 24.9	21.0		9.5	36.5	10.6		9.5	25.4	11.6		9.5	39.4	9.0		8.7	35.5	29.2	A
7.8	42.8	39.0	A	7.3	42 20.8	34.0		9.2	28.1	43.4		9.4	27 41.7	14.2	A	8.9	38.2	44.7	
8.5	44.8	46.0	A	9.5	47.5	16.0		7.4	49.3	3.7	A	9.5	56.3	10.2		9.1	43.9	29.2	
8.5	21 9.8	18.8	B	8.9	53.3	48.4	A	9.1	56.2	52.5		9.5	28 2.0	59.9		7.0	45.6	15.9	A
8.5	53.9	46.5	A	9.5	43 49.8	42.3		9.3	9 6.4	32.8		8.8	4.4	16.2	A	8.3	44 25.3	41.6	A
9.5	55.7	24.3		9.2	44 35.4	46.9		8.8	11.9	34.9		9.5	10.5	15.2		9.2	26.9	4.2	
9.3	59.6	40.9	B	9.5	45.4	43.5		9.0	39.5	41.8		7.3	14.7	46.1	A	9.0	45 11.1	55.5	
9.0	22 6.6	54.9	A	9.5	51.3	55.0		9.5	10 46.0	30.7		9.3	56.3	28.7		9.5	44.3	59.5	
9.4	17.2	40.9	B	9.2	45 24.4	51.0		9.5	53.0	39.5		9.5	56.4	56.0		9.5	52.3	38.6	
9.1	30.2	47.1	B	9.3	50.3	57.0	B	9.3	11 5.8	32.0	B	9.5	29 3.2	5.8	B	9.3	46 15.9	33.8	
9.4	43.7	58.4		9.1	46 30.9	7.4	R	6.7	15.2	6.3	A	9.2	44.7	22.2		9.5	31.5	24.7	
9.5	23 39.1	51.1		9.5	35.0	9.7		9.4	18.4	11.0		9.3	47.1	8.5		8.3	55.8	35.1	B
9.2	43.9	5.7		9.5	47 49.3	56.4		9.0	56.1	39.4		9.5	30 1.0	12.7		8.3	47 7.2	16.[illegible]	
8.2	48.0	51.9	B	8.3	48 6.8	55.7		7.2	13 12.1	2.0	A	7.8	24.9	25.2	A	9.5	9.5	23.2	
9.4	24 8.5	36.2		8.2	9.0	18.1	A	9.5	53.9	30.9		9.5	27.2	56.5		9.5	28.5	30.6	
9.4	26.4	33.0		9.2	31.1	34.0		9.5	14 18.8	53.2		9.3	48.3	47.6		9.5	48 2.1	17.5	
9.1	25 41.3	55.4		9.5	40.0	2.8		9.3	15 4.2	53.5		8.4	49.2	50.2		9.1	10.4	23.2	
9.5	51.4	35.0		9.5	51.0	33.3		8.3	27.2	54.2	A	8.6	31 9.9	17.2	A	9.5	18.5	43.1	
9.4	26 11.5	35.7		9.5	50 1.9	40.5		9.5	28.6	22.8		9.5	41.5	45.2		9.5	32.9	16.2	
9.3	22.0	10.2		8.3	23.4	49.4	A	9.5	39.5	22.4		8.3	49.6	4.2	A	9.5	41.3	29.2	
9.3	34.6	57.4		8.3	54.8	39.9	A	9.5	41.5	21.7		8.9	32 4.3	11.8		8.4	47.3	21.2	
9.3	50.9	45.0		9.4	51 28.4	39.0		9.5	55.5	19.8		9.5	44.2	6.0		8.1	49 2.0	4.6	A
9.4	27 25.8	9.2		9.3	36.9	32.4		9.4	16 13.9	40.3		8.6	47.5	14.7	A	9.5	27.5	29.7	
9.5	26.8	18.9		9.3	52 35.4	22.1		9.3	15.8	11.1	B	9.2	33 11.0	44.6		9.5	29.0	57.0	
8.8	28.3	50.9		9.2	45.0	1.0		9.5	18.5	18.4		9.2	56.8	3.5		8.4	50 8.8	53.8	
7.5	54.6	49.9	R	9.3	47.1	29.5	B	9.0	49.2	26.4		8.4	35 5.4	22.7		9.5	27.0	25.7	
9.5	28 13.0	9.3		8.4	55.4	10.2	B	9.5	49.2	6.0		9.5	15.1	26.9		9.5	48.7	58.3	
8.8	22.9	43.0		8.8	53 16.6	37.0		9.3	17 25.2	42.9		9.2	24.9	16.7		9.3	51 1.0	30.6	
9.5	25.2	18.5		8.0	55 20.3	16.4	G	6.5	29.0	39.3	A	9.5	52.3	2.2		9.5	5.9	3.1	
9.1	36.8	37.0		9.5	58.5	7.6		8.8	30.2	59.2		9.5	57.5	32.1		9.5	52 4.1	11.8	
6.8	29 21.6	27.5	L	8.8	58 9.1	50.6		8.0	36.9	31.6	A	9.5	36 20.5	8.0		8.3	14.5	37.6	A
9.5	44.5	10.3		9.5	12.7	16.5		8.7	40.4	19.9		9.1	37 15.5	28.2		8.8	37.6	8.1	
9.0	53.2	46.2	A	9.4	15.2	10.9	B	8.4	42.7	27.6	A	8.7	28.1	5.5	A	9.5	43.2	34.6	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	18h—19h	+49°			19h	+49°			19h	+49°			19h	+49°			19h—20h	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	53 21.5	41.1		8.8	8 55.7	30.2	A	9.5	25 30.6	33.9		9.2	37 29.2	43.0		9.4	52 12.9	13.8	
9.5	31.2	29.2		9.3	57.8	15.2		9.5	33.1	2.8		7.7	35.7	21.3	A	8.3	59.2	15.9	A
9.5	45.5	36.7		9.5	9 18.7	53 5		8.0	59.7	12.5	A	8.2	52.5	39.0	A	9.0	53 17.2	49.7	B
9.5	49.0	28.2		9.5	38.7	21.6		9.2	26 10.1	32.6		8.8	38 2.7	1.8	A	8.5	54.6	57.5	A
9.4	54 15.3	5.1		8.2	10 23.6	31.0	B	9.5	19.4	13.8		9.3	28.4	26.5		9.4	54 3.0	58.1	
7.8	55 15.2	8.1	A	9.5	11 8.9	23.2		9.5	23.2	36.5		8.8	39.8	37.9	A	9.4	13.7	28.7	
8.3	21.8	19.2	A	9.2	29.2	28.2		9.5	28.4	13.1		9.5	42.6	46.1		9.0	59.5	54.1	
8.4	27.2	23.2	A	6.3	32.0	49.5	S	9.5	29.7	55.6		9.4	39 2.4	7.9		9.3	55 6.0	55.4	
9.5	56 20.3	48.1		7.3	12 29.8	10.7	A	9.5	31.3	34.4		9.4	24.8	27.5		9.0	11.6	27.7	
9.4	24.4	23.4		9.3	40.5	47.1		9.2	45.9	2.6		9.5	30.5	38.2		9.4	11.8	16.2	
9.4	24.9	26.0		8.8	46.9	28.2	A	8.8	48.1	6.6	A	9.1	39.4	6.1		9.5	19.7	41.9	
9.5	51.7	15.2		9.0	13 20.5	42.6		8.8	58.2	40.8	A	7.5	57.0	26.1	A	9.2	32.4	2.7	
9.5	57 26.2	25.7		7.8	29.2	36.1	A	7.8	27 10.6	53.4	A	9.5	40 16.7	8.2		9.0	37.0	30.3	
9.5	30.6	7.7		9.1	14 31.3	57.5		6.0	29.1	59.6	A	9.1	50.3	45.8		9.3	47.9	27.4	
8.5	51.4	30.6	A	8.8	33.5	19.2	A	9.5	40.0	3.5		9.3	41 6.6	53.2		8.9	48.9	22.8	
9.4	58 3.2	35.6		8.0	45.2	57.8	J	9.2	55.2	40.9		9.2	33.0	39.2		8.5	56 52.0	51.0	
9.1	15.2	24.0	B	6.3	46.9	18.1	A	9.3	58.5	30.1		9.5	39.6	44.8		9.3	58.8	36.4	
8.9	17.3	25.8	A	8.7	15 6.3	35.6	R	8.3	28 11.2	51.5	A	9.2	44.3	38.3		5.1	57 15.3	41.7	S
9.5	33.2	36.1		9.4	20.0	3.5		9.2	23.4	8.8		9.5	56.0	43.1		9.5	19.0	41.3	
9.5	46.9	10.7		9.5	25.0	9.7		9.5	36.5	49.0		9.5	42 10.2	22.7		9.3	19.1	29.7	
9.1	59 4.2	16.2		9.4	16 2.9	6.5		9.4	51.3	22.6		6.5	33.9	39.0	A	9.3	34.1	6.4	
9.4	4.5	12.7		9.5	22.6	28.2	B	9.4	29 12.3	33.0		9.5	34.0	21.5		9.0	59.0	32.0	
8.8	9.4	23.7	A	9.5	35.4	24.8		9.5	21.7	5.9		9.0	38.5	53.7		8.7	58 1.7	36.5	
8.8	17.9	28.2	A	7.8	44.1	11.8	A	9.1	45.7	43.8	B	8.5	44.2	59.7	A	9.1	7.4	21.2	
9.2	59.9	21.7	A	9.3	55.1	27.5	B	9.3	46.7	44.6		8.7	58.4	50.9	A	9.1	16.1	26.7	B
7.7	0 0.8	25.2	A	9.0	17 2.2	11.4	A	9.4	47.2	52.0		9.3	43 16.3	50.2		9.4	16.2	5.7	
9.0	5.6	12.5	A	9.3	18 2.8	22.4		9.4	52.2	14.2		9.5	24.0	3.1		9.2	18.7	11.4	B
9.3	45.8	53.0		9.2	10.3	16.7	A	9.4	57.5	11.2		9.5	41.9	43.7		9.5	49.5	36.2	
6.3	1 25.8	42.6	G	9.1	18.6	23.0	B	9.1	30 21.0	17.6		9.0	52.5	17.6		9.5	59 2.8	30.4	
9.0	33.3	16.2		9.5	19 16.2	27.5		9.4	43.2	39.3		9.5	44 8.8	6.8	B	7.0	6.8	53.8	A
9.1	46.3	43.4	B	9.0	25.0	29.5	R	9.0	45.8	58.9		9.5	12.6	17.6		9.4	10.2	19.7	
7.8	51.2	6.5	A	9.2	26.4	10.3		9.5	31 0.0	8.4		9.5	52.0	40.5		9.5	20.6	0.6	
8.8	59.5	31.1		9.4	27.6	19.5		9.5	1.5	36.0		9.0	45 7.8	32.4		9.5	21.4	42.9	
9.5	3 5.7	53.1		6.6	36.5	59.5	A	9.5	35.3	12.4		9.5	16.9	3.6		9.5	43.6	33.6	
9.1	11.5	18.7	A	9.5	20 3.9	49.7		9.1	41.5	26.1		9.5	50.1	39.3		9.4	45.0	28.4	
9.3	12.9	33.5		9.5	15.6	34.4		9.5	52.0	41.1		9.5	57.3	29.3		9.4	46.3	31.0	B
7.8	23.3	23.3	B	8.9	26.7	58.5		9.4	32 0.6	34.7		9.4	46 15.4	25.5		9.4	53.2	11.3	
9.2	45.2	48.6		9.5	36.4	4.8		8.8	2.2	21.7		9.3	18.6	52.1		9.4	0 3.4	28.0	
9.0	47.8	36.8	B	7.5	44.2	57.0	A	7.0	3.0	54.8	A	9.1	20.7	41.9		8.9	6.2	40.6	A
7.8	58.7	15.2	A	9.5	21 11.3	1.7		9.4	10.8	31.6		9.0	23.7	52.5		9.1	28.6	14.1	
9.3	4 26.2	24.7		9.5	32.5	2.5		9.0	22.2	30.1	B	9.1	32.4	2.8		9.3	46.8	38.7	
9.3	43.3	34.1		8.8	34.6	37.3		4.9	33.7	53.1	A	9.2	38.6	26.7		9.5	48.9	41.8	
9.5	5 5.5	23.2		7.9	40.0	47.0	L	9.5	38.4	7.7		7.8	48.5	59.1	L	9.5	1 20.0	35.7	
9.4	35.9	32.4		9.5	52.8	13.2		var	55.8	52.6	G	9.2	49.8	46.0		9.3	33.6	23.7	
9.1	36.5	50.5		9.1	53.7	58.5		9.0	57.9	54.2	J	7.3	51.8	20.0	L	9.2	34.5	14.7	
9.2	42.5	43.6		9.5	54.9	46.0		9.2	33 16.5	17.1		9.4	47 18.6	13.2		9.3	2 0.1	52.4	
9.0	6 10.8	27.1	L	9.2	22 3.4	9.2		9.5	35.1	20.5		9.5	48 16.9	7.7		9.2	1.4	50.9	B
9.5	24.4	35.1		9.5	23.2	32.1	B	9.5	38.0	55.6		9.5	19.4	38.8		9.5	23.5	20.0	
9.3	28.5	30.6		7.9	24.1	8.7	B	9.0	45.6	0.2	B	8.8	27.2	11.5		9.0	26.9	32.6	A
9.4	58.8	35.1		9.2	44.5	9.0		9.0	54.0	21.9	A	8.8	29.6	6.4		9.5	37.8	36.7	
9.3	7 14.2	4.3		8.6	50.9	51.6	J	9.4	34 6.1	19.3		9.2	49 25.4	16.2	B	9.1	37.9	39.8	
9.3	22.5	50.8		7.3	56.4	51.1	G	9.1	16.7	45.4		8.1	38.4	12.9	A	9.2	55.9	32.8	B
9.1	40.0	36.2		9.5	23 10.0	49.3		9.0	43.4	52.5		9.5	59.6	38.7		9.5	55.9	15.6	
9.3	40.2	32.9		8.8	11.6	56.3		9.0	35 2.8	10.0		9.1	50 21.4	12.0	A	9.0	56.5	46.3	
9.3	41.4	32.1		9.2	24.1	58.5		9.4	11.0	59.8		9.5	41.0	50.8		6.7	3 2.4	48.6	
9.9	47.1	31.8	B	9.5	39.2	47.8		9.3	12.5	12.6		9.1	45.0	55.0		9.3	3.6	13.0	
9.2	54.2	13.4	B	9.0	54.5	13.3		9.3	49.6	40.4		9.5	51 0.2	29.8		9.4	10.9	13.[illegible]	
9.5	56.0	16.9		9.0	24 1.0	28.2		9.2	36 1.9	53.7		8.9	34.8	51.9	B	9.0	13.0	4[illegible]	
9.2	8 20.4	35.3	B	9.5	34.3	34.5		9.5	21.6	57.0		9.5	40.7	47.0		9.3	13.9	[illegible]	
9.5	43.3	8.8		9.5	25 18.8	39.8		9.4	37 17.3	29.6		9.4	45.2	47.0		9.3	15.8		

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	20ᵐ	+49°			20ᵐ	+49°			20ᵐ	+49°			20ᵐ	+49°			20ᵐ—21ᵐ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	3 16.7	2.9		9.2	16 59.7	12.4		7.4	31 10.0	55.1	A	9.5	44 8.0	57.0		9.1	57 30.5	2.0	
8.7	26.5	11.1	A	9.5	17 4.1	36.7		8.7	11.0	32.0	A	9.4	34.0	32.4		9.0	37.1	12.0	
9.3	54.6	24.7		9.5	15.2	3.0		9.5	26.1	2.8		9.4	38.0	3.2		7.9	38.0	3.6	A
9.1	4 12.4	9.5		9.5	40.0	46.4		8.7	26.4	37.5	A	9.5	38.1	6.3		9.0	43.9	42.6	
9.5	15.7	27.5		8.8	43.1	6.8		9.5	39.4	8.2	B	9.4	45 3.2	20.9		9.5	58 1.4	34.6	
9.5	36.5	43.0		9.4	18 9.7	49.8		8.9	58.2	1.9	A	6.8	3.5	35.0	A	9.5	34.5	8.1	
8.5	43.7	26.4		8.9	18.9	41.4		9.5	58.9	24.6		9.5	17.4	20.2		9.4	34.7	13.8	
9.5	55.6	32.7		9.0	43.0	20.1		9.4	32 4.3	21.0		9.1	30.3	26.4	B	6.2	42.0	46.4	A
9.5	5 25.6	6.4		9.5	50.4	42.4		9.3	6.8	25.0	B	9.5	36.4	21.0		9.5	59 12.2	8.1	
9.5	51.8	48.4		9.1	58.7	50.1	B	9.5	7.5	27.7		9.4	56.9	34.5		9.0	13.4	31.5	A
9.2	6 1.3	48.6		9.5	59.1	42.4		8.9	7.6	31.4	A	9.0	58.4	31.8		9.2	18.1	45.4	
7.3	10.0	23.3	A	9.5	19 0.4	53.3		7.2	22.3	24.4	A	9.5	59.9	59.6		9.5	19.6	5.1	
9.5	43.6	45.1		9.4	2.0	54.3		9.2	33.5	17.6		8.6	46 5.9	4.7		9.4	43.0	27.9	
9.5	50.3	6.9		9.5	24.6	52.8		9.3	49.2	34.6		9.2	13.0	57.4		9.4	50.3	27.3	
9.0	51.4	1.3	A	9.2	27.4	42.9	B	9.4	54.5	53.4		9.5	15.1	13.7		8.0	52.7	54.3	A
8.5	52.2	19.7	A	9.5	42.9	37.2		9.4	33 28.8	45.6		9.5	31.0	54.0		8.8	59.1	20.1	
9.3	54.1	49.5		9.3	20 10.7	11.1	B	9.3	43.3	30.5		9.5	43.1	4.1		8.7	0 4.5	27.1	A
9.1	7 29.5	16.8		8.1	21.3	40.7	B	9.1	55.7	52.4		9.2	47.8	43.1	B	8.1	14.6	40.9	A
9.4	48.1	7.1		9.4	28.2	42.3		9.0	59.8	38.1		7.4	56.1	6.8	A	9.0	39.7	55.8	A
9.4	54.4	19.2		9.0	21 32.7	0.6	A	8.8	34 10.9	40.2		8.4	47 6.0	9.2	A	9.4	1 0.5	18.2	
9.5	8 0.2	0.5		9.3	42.6	47.7		9.2	19.6	52.0		8.5	18.5	8.6	A	8.9	12.9	19.1	A
8.0	14.6	49.0	G	9.5	50.5	31.8		9.5	35 47.6	50.7		8.4	48 6.3	14.0	A	9.5	37.1	47.0	
9.1	15.0	53.3		9.5	22 8.4	26.6		9.5	52.7	1.6		9.2	7.9	56.1		9.5	59.6	1.9	
9.5	31.5	11.8		9.5	9.1	55.9		9.3	54.0	58.6		9.5	39.6	38.3		8.8	2 3.0	50.4	
8.7	32.4	1.1	A	9.3	43.7	45.7		9.4	57.4	52.5		8.5	52.5	55.5	A	7.4	29.2	12.5	A
9.3	43.8	58.5		9.2	59.5	48.9		8.7	36 14.6	44.1		8.9	49 5.7	40.0	A	9.0	3 9.7	2.2	A
8.0	47.5	45.1	A	8.0	23 19.2	27.4	B	9.4	18.3	5.1		9.5	10.1	45.9		9.5	23.6	31.1	
9.4	57.8	1.6		9.1	54.6	41.9		9.1	41.5	2.1		9.5	19.3	48.8		8.8	32.5	44.6	
9.2	9 1.3	21.4	B	9.0	24 3.5	53.0		9.1	37 26.8	8.8	A	9.5	32.6	7.0		9.5	4 7.8	11.3	
9.5	2.1	7.3		9.2	33.0	48.6		9.5	35.0	39.4		8.0	41.3	58.0	A	9.5	35.0	16.7	
9.3	20.7	16.5		7.1	25 1.3	58.6	A	9.4	35.0	59.9		9.3	54.5	30.1		9.2	46.1	48.6	
9.5	10 0.1	11.4		8.4	22.6	50.0	A	8.0	39.2	13.0	A	9.4	50 8.6	47.4		8.9	5 54.3	14.5	A
9.1	29.5	29.9		9.5	23.5	58.7		5.7	44.6	49.3	A	9.4	14.8	30.5		8.7	58.5	52.9	A
9.0	31.0	17.0		9.0	36.2	11.0	B	9.5	38 1.1	8.2		9.3	15.5	31.2		9.0	6 15.2	48.3	A
9.5	47.0	36.9		9.2	37.1	12.8		9.2	2.9	18.5		8.8	27.0	18.0	A	9.1	36.1	31.1	A
6.3	11 30.6	47.0	A	9.4	41.6	24.0		9.2	20.3	55.3		9.1	46.2	52.3		7.7	39.5	48.7	A
9.5	32.7	4.3		9.3	45.6	17.7	B	9.5	55.6	15.3		8.7	58.0	18.7	A	9.2	40.8	8.0	
9.3	41.4	19.7		6.9	56.4	17.7	A	9.5	58.2	55.8		9.4	51 4.2	36.1		9.0	40.8	18.7	A
9.1	12 0.5	28.1		9.5	26 5.2	45.4		9.5	59.5	7.9		9.3	38.8	14.3	B	8.9	41.6	3.2	A
9.5	22.0	40.0		9.4	26.0	27.7		9.2	39 0.4	42.5		8.6	52 0.3	7.0	A	9.0	8 18.0	47.1	A
9.5	29.8	43.2		9.3	26.4	33.4		9.2	11.2	22.5		9.3	6.1	50.7		9.0	9 18.1	28.5	A
9.5	31.0	11.8		9.5	34.1	52.3		9.4	15.7	10.4		9.5	35.2	1.6		9.0	22.6	30.7	A
9.5	32.2	14.9		8.8	49.9	34.2		9.3	18.8	37.9		9.0	53 2.1	9.4	A	9.4	27.8	38.0	A
8.2	37.0	56.4	A	9.2	27 14.5	37.5		9.5	49.7	32.5		9.0	12.5	51.6		9.0	29.9	38.8	B
8.0	44.5	50.2	A	8.0	19.7	3.1	A	9.5	40 12.1	50.3		9.4	21.4	21.6		9.2	51.7	8.5	
9.5	13 3.1	8.0		9.4	31.0	21.6		9.3	36.9	36.9	A	5.5	51.7	54.2	A	9.5	10 26.1	17.2	
9.0	9.4	56.0		9.5	53.5	52.5		9.3	43.7	10.8		9.4	54 17.5	11.7		9.5	31.0	59.9	
9.4	53.6	17.9		9.5	58.0	5.2		9.3	46.1	8.2		9.3	20.7	41.3		9.1	38.4	48.3	A
8.8	14 9.2	17.6		9.3	28 12.9	28.0		9.4	55.8	42.5		8.5	29.8	6.5	A	9.0	11 22.5	29.7	A
8.0	22.1	2.9	J	6.7	33.5	20.5	A	9.4	41 10.0	18.6		9.4	39.2	27.1		9.3	30.6	0.6	
8.3	40.3	10.2		9.4	36.8	59.1		9.0	59.8	33.3		8.7	48.0	38.8	A	8.5	12 23.4	54.5	A
9.4	43.3	7.6		9.4	52.1	2.9		9.5	42 0.5	13.0		9.4	58.7	49.5		9.0	49.1	41.6	
9.2	15 6.4	55.4		7.9	56.9	37.2	A	9.4	32.2	1.9		9.0	55 0.0	54.1		9.2	57.0	14.3	
8.9	7.8	21.8		9.1	29 10.8	51.6		9.5	45.4	37.7		9.4	3.0	25.6		8.3	13 16.5	18.2	A
9.5	15.9	40.2		8.8	24.6	13.4	A	9.3	43 18.0	12.2		8.8	12.6	30.0	A	9.4	18.0	54.7	A
9.4	25.4	40.4		8.9	27.5	27.7	A	9.2	29.3	49.6	B	9.1	32.3	4.8		9.5	25.9	0.0	A
9.5	47.8	55.8		7.3	49.5	16.5	A	9.1	33.7	49.6	B	9.0	57.7	56.0	B	9.0	33.0	18.7	
9.2	16 0.9	38.5		9.5	30 3.0	5.7		7.8	38.0	27.7	B	9.4	56 44.5	29.0		7.9	45.5	34.3	B
9.4	19.8	14.7		9.0	15.6	27.1		9.5	53.6	1.7		8.9	44.8	22.2		7.0	49.8	27.5	B
8.8	44.0	13.6		9.3	21.0	52.4		7.6	44 2.4	56.8	A	8.5	57 8.0	4.6	A	9.4	54.2	6.6	

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	21ᵘ	+49°			21ᵘ	+49°			21ᵘ	+49°			21ᵘ—22ᵘ	+49°			22ᵘ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.6	14 26.4	0.3	G	9.2	30 55.5	45.8	A	9.4	41 54.1	7.6		8.8	50 56.7	23.7		9.5	1 58.3	23.7	
8.8	46.4	28.8	B	7.0	31 2.4	51.2	B	9.3	42 9.3	1.2		8.8	51 2.3	2.0		9.0	2 4.4	37.6	
9.5	57.0	56.0		9.0	4.6	8.9	A	9.5	19.6	10.3		9.5	7.0	32.1		9.4	8.2	14.8	
9.5	15 46.0	51.6		9.5	10.1	36.1		9.4	20.3	5.3		9.4	11.0	21.1		9.4	25.3	42.3	
9.3	16 11.7	50.3		9.3	14.7	48.2		9.3	35.2	9.3	B	9.5	14.7	25.4		9.1	31.4	0.0	A
9.5	45.0	50.6		9.3	18.1	37.1		9.5	43 2.5	54.8		8.8	27.6	33.8		6.9	39.0	5.2	A
9.4	17 8.6	46.6		9.4	30.3	7.2		9.5	3.0	37.1		9.3	31.0	47.0		9.5	3 9.6	55.5	
9.5	9.5	1.5		8.5	52.7	52.3	A	9.4	3.8	30.2		9.1	31.0	42.8		9.1	16.8	22.1	
9.5	36.7	21.7		9.5	55.5	49.7		9.1	25.9	55.0	A	9.3	42.5	21.3		9.3	26.5	8.6	
9.0	39.6	52.5		9.0	56.5	52.5	A	9.0	27.0	49.1	A	8.9	47.0	37.9	A	9.1	33.0	42.0	
9.0	51.4	52.6		9.3	32 1.5	50.4		7.6	44.1	0.6	G	9.5	52.0	58.3		9.3	33.1	13.0	B
9.2	18 14.8	44.6	B	9.0	49.1	42.8	A	7.3	56.3	50.7	A	7.7	55.0	48.3	A	9.5	49.2	33.2	
8.3	34.0	52.7	A	9.5	54.3	7.2		9.3	44 21.1	12.9	B	9.1	58.0	17.6		9.2	56.2	0.5	
8.3	58.3	48.9	A	9.0	54.6	57.2	A	9.4	27.5	47.6	A	9.2	59.0	26.5		9.3	4 0.6	4.9	
9.4	19 10.5	10.7		9.5	54.9	55.2		8.5	37.8	19.1	A	9.2	52 0.1	24.8		9.5	29.8	55.2	
7.7	12.3	48.8	A	9.5	55.3	5.8		9.5	50.3	21.3		8.6	0.1	33.5	A	9.5	39.5	35.5	
9.0	51.5	36.6	A	9.5	57.3	2.5	B	9.4	53.6	12.7	B	8.7	3.5	37.7	A	9.5	44.4	44.0	
9.0	20 0.1	49.4	A	8.5	33 15.4	16.7	G	9.5	55.4	47.3		9.5	27.0	21.4		9.5	56.9	14.0	
8.8	3.3	20.7		6.7	15.9	8.5	G	9.5	45 9.5	41.3		8.1	27.7	52.5	A	9.4	5 30.0	59.5	
9.4	9.1	12.7	B	9.4	30.1	55.8	A	9.4	19.8	5.5		9.5	49.3	9.2		8.5	32.7	55.6	A
8.8	21 0.0	12.4		9.1	30.6	48.9	A	9.1	46.1	42.7	A	9.5	53 11.8	51.4		9.4	40.5	30.8	
8.7	12.0	9.6		9.1	32.4	6.0		9.5	47.0	59.7		9.4	17.7	3.2		9.4	53.4	30.6	
8.7	24.8	5.3		8.9	44.2	0.4		9.5	52.3	46.2		9.0	26.8	52.4	A	9.5	56.3	5.5	
9.3	48.6	53.0	A	8.9	49.1	19.2		8.2	59.1	12.5	A	9.5	30.0	24.4		7.8	6 3.4	13.4	A
9.5	22 6.0	0.2		9.5	34 30.0	58.3		9.0	46 5.5	0.1		9.1	34.0	35.2	A	9.4	4.6	18.8	
9.5	28.5	5.8		9.4	30.0	57.0		9.5	12.5	5.5		9.4	37.9	1.1		9.5	15.9	56.5	
9.3	29.1	7.5		9.5	33.5	47.3		8.7	17.6	19.5	A	9.1	54 6.1	54.9		7.2	18.0	28.7	A
9.5	23 9.0	56.3		9.0	35.1	44.0	A	9.0	51.0	7.4	A	9.5	8.9	43.4		9.5	21.5	5.1	
9.3	17.0	1.0		9.0	46.6	33.6	A	9.5	47 8.2	15.5		9.5	23.5	53.0		9.5	24.6	13.3	
8.5	22.8	56.1	B	7.0	56.8	1.5	A	9.5	13.1	32.8		9.4	29.4	21.9		9.4	29.0	1.0	
7.7	30.7	48.9	A	9.5	35 10.1	50.9		9.3	19.2	43.4		8.6	32.8	50.5	A	9.4	54.4	0.3	
8.9	32.2	45.0	A	9.5	36.5	0.5		9.2	19.4	4.5	A	9.5	34.0	10.5		9.5	57.5	37.8	
9.0	36.1	13.7	S	9.5	36 17.1	54.5		8.8	23.6	11.0	A	8.8	45.4	6.3		9.0	59.3	8.5	
7.0	43.4	8.3	L	8.8	33.0	46.1	A	9.3	31.3	36.3		9.5	57.0	49.6		9.4	7 10.4	57.9	
9.4	24 14.6	41.6	A	9.0	39.2	51.8	A	9.5	34.3	25.7		9.4	55 1.8	5.7		9.0	13.9	41.7	A
9.0	52.9	2.0	A	9.4	54.6	2.2		9.5	37.7	46.1		9.1	24.0	49.3	A	9.2	42.5	46.9	
9.1	25 18.4	58.2		7.8	37 32.1	30.3	B	9.5	42.4	55.8		9.5	41.9	54.8		9.0	47.8	35.4	A
9.5	33.1	56.5		9.4	41.4	21.9		9.3	54.1	47.0	B	8.9	56 8.3	28.3		9.5	8 9.3	36.9	
9.4	58.0	28.2		9.4	42.0	17.3		9.5	48 0.5	5.0		9.2	16.2	19.6		9.2	16.9	31.8	
8.9	26 2.5	29.6	A	9.3	50.7	18.8		9.5	28.8	57.7		9.5	57 13.4	54.4		9.4	30.1	1.6	
9.4	8.6	28.7	B	9.5	52.7	6.1		9.1	38.4	52.5		9.5	25.7	17.4		9.3	38.8	12.2	
9.0	11.4	56.2		9.2	38 2.8	7.8		9.3	45.4	34.6		9.5	35.6	8.7		8.5	44.3	9.0	
8.8	16.3	33.1	A	9.4	20.5	4.8		9.0	54.9	23.0	A	9.1	38.3	12.2		9.4	45.9	18.9	
8.4	25.2	1.8	A	9.3	32.8	40.9		8.9	55.1	58.8		9.5	42.5	4.0		8.7	59.3	8.5	
9.2	28.1	49.3		8.8	41.9	54.1		9.3	59.7	44.7		9.5	58 7.4	22.3		9.5	9 4.6	48.4	
8.8	50.3	50.0		9.4	39 12.7	11.6		9.4	49 24.3	7.9		7.1	7.9	4.2	A	9.0	12.7	4.4	
9.5	55.1	11.5	A	9.1	18.0	40.4		8.8	31.6	28.8	A	9.5	35.7	11.2		9.4	14.8	39.1	
8.5	27 5.0	46.3		8.8	27.6	44.8		9.3	31.9	18.1	B	8.2	59 18.5	23.8	A	9.3	19.3	9.4	
8.7	5.1	16.7	A	9.3	32.5	28.2		9.0	36.5	33.8	A	9.4	41.5	53.8		9.4	27.7	1.7	
9.5	14.0	7.2	A	9.4	35.2	37.5		9.5	40.5	2.7		9.5	44.0	32.0		8.5	27.8	9.7	S
9.4	42.6	42.1		9.4	40 3.0	48.9		8.8	44.0	37.9	A	9.5	56.0	28.8		9.2	32.5	20.8	
8.6	49.0	8.0	A	9.5	14.8	51.9		9.4	49.9	18.3	B	9.5	0 8.0	8.6		8.0	40.3	41.0	F
6.0	49.5	18.2	A	9.5	21.1	16.0		9.1	52.0	48.7		9.4	16.7	28.7	B	9.5	41.7	5.5	
9.5	28 52.3	53.0		9.4	28.7	26.3	B	9.3	54.0	32.5	A	9.5	22.5	21.5		9.4	59.4	54.0	
9.4	29 5.8	50.0		8.8	37.6	37.8		9.2	50 18.5	23.5		9.0	32.8	12.1	A	9.2	10 7.4	39.[illegible]	
9.4	29.4	22.7	B	9.1	44.8	15.8		9.0	19.5	10.5		7.5	36.3	35.3	A	9.1			
9.5	54.6	45.6		9.5	45.4	1.9		9.5	20.2	9.5		8.3	39.7	31.8	A	9.3			
9.1	30 2.8	11.7	A	9.3	41 22.3	36.9		9.1	20.8	16.2		9.4	1 5.8	45.7		9.4			
9.4	46.6	14.2	A	9.2	32.5	10.4		9.5	22.7	51.2		9.4	32.6	26.7		8.3			
9.2	48.3	2.5	B	9.5	41.6	55.7		9.5	31.4	40.6		9.3	53.3	41.6	B	8.[illegible]			

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	22ʰ	+49°			22ʰ	+49°			22ʰ	+49°			22ʰ	+49°			23ʰ	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.5	11 32.3	40.0		9.5	22 9.4	3.6		9.4	35 23.6	1.7		9.2	48 36.3	27.8		9.5	0 4.8	49.7	
9.1	35.1	58.3		8.9	16.9	51.5	B	8.9	32.3	3.5		8.3	42.0	17.2	A	9.2	6.0	25.1	A
8.5	43.9	50.9		9.4	47.8	47.5		9.5	43.7	41.7		8.5	55.3	12.3	A	9.0	9.7	52.1	A
9.4	56.7	9.0		9.0	52.0	24.3		9.4	47.5	30.8		9.2	56.8	35.2		9.5	27.8	21.0	
8.0	12 5.3	6.5	A	8.8	23 5.8	47.9	G	8.0	36 36.4	22.9	A	8.8	49 24.9	51.3	A	7.3	35.2	24.6	A
9.5	16.5	22.6		8.4	14.0	5.8		9.5	37.6	0.9		9.2	28.3	52.5		9.3	59.1	56.3	
9.5	53.3	56.0		9.5	21.7	52.0		9.2	52.7	29.3		9.1	28.9	24.9	A	9.4	1 4.9	3.9	
9.0	13 2.5	33.5		9.4	38.7	2.7		9.3	54.0	26.3		9.3	42.4	58.2		9.4	20.0	9.8	
9.5	3.0	16.3		9.4	24 20.3	26.2		9.5	37 38.6	5.4		9.0	47.8	54.3	A	9.5	20.7	0.6	
8.5	12.3	30.4		9.3	36.5	1.7		8.8	38 14.4	18.0	A	8.7	53.0	57.2	A	9.5	21.2	19.4	
9.1	13.5	42.9		9.1	56.7	5.3		9.4	17.9	50.1		8.2	50 0.3	45.8	A	9.5	41.0	58.6	
9.3	32.0	14.7		8.5	57.8	46.6	A	9.1	27.1	12.4	A	9.5	18.8	17.2		8.2	2 5.0	16.3	B
9.3	38.4	3.5		9.2	25 7.0	45.9	B	9.4	59.2	46.2		9.5	39.6	13.7		9.4	10.0	44.6	
9.4	38.4	14.9		8.0	10.3	37.6	A	9.0	39 12.3	39.3		9.4	54.2	12.3		9.5	11.3	8.9	
9.3	39.5	52.2		4.0	19.3	32.2	A	9.5	23.5	24.4		8.5	58.9	57.0	A	8.7	33.5	12.2	B
9.2	40.0	27.3		9.0	25.3	8.8		8.4	47.2	33.4	A	9.5	51 28.3	50.4		9.3	40.6	19.0	
9.1	53.3	24.8	A	8.0	30.3	51.1	A	7.5	40 6.3	26.8	A	9.5	30.0	20.7		9.0	3 15.8	46.4	
9.0	14 12.4	55.8	A	9.5	39.5	23.6		8.6	15.9	0.2		9.5	32.0	45.7		9.2	18.5	39.5	
9.0	18.5	50.9	A	9.3	41.4	29.1	B	9.5	33.0	51.7		9.5	36.7	7.3		7.2	32.9	12.4	A
8.5	18.5	8.2	A	9.3	44.6	14.0		9.5	41.0	6.7		9.5	54.8	40.8		9.5	55.0	33.4	
8.8	27.6	34.1	A	9.1	47.7	18.9		9.2	50.5	28.8	A	9.4	52 7.0	58.1		9.3	55.0	17.7	
9.5	29.9	55.0		9.0	48.2	19.8	B	9.5	41 33.0	33.4		9.4	7.3	50.0		9.5	58.2	43.5	
9.1	32.8	34.1	A	9.2	26 25.7	4.3		9.5	35.0	30.6		7.9	13.7	55.5	A	9.5	4 7.4	12.4	
8.7	53.3	14.8	A	9.3	54.0	27.3		8.9	55.8	19.1		8.5	15.0	4.8	A	9.5	12.8	33.1	
8.7	54.3	13.6	A	9.5	27 2.5	16.3		9.5	42 36.3	48.8		9.4	16.2	32.3		6.6	49.5	59.0	A
9.2	58.0	22.6		8.2	6.4	36.8	A	9.4	55.0	32.1		9.2	21.3	56.1	A	9.5	5 9.0	53.8	
9.5	16 11.8	13.4		9.5	8.1	1.1		9.2	57.1	8.5		9.4	27.2	38.7		9.5	33.0	29.5	
8.9	15.1	4.5	A	9.5	17.0	2.1		9.1	43 19.4	50.8		9.4	49.8	4.1		9.5	6 54.7	10.1	
9.3	31.7	1.2		9.1	17.8	26.7		9.0	19.8	30.0		9.5	54.2	49.8		9.5	7 26.5	22.6	
9.4	36.6	5.0		9.3	18.9	50.4	A	8.9	22.3	30.8		9.4	53 3.5	58.9		9.0	30.6	12.4	
9.5	38.3	46.1		9.5	28.7	58.7		9.5	27.9	21.4		9.3	22.0	36.3	A	6.5	37.9	49.9	A
8.7	17 27.5	36.1		9.3	40.4	41.6		8.0	41.2	14.7	A	9.5	39.8	32.8		9.5	8 50.8	46.8	
9.1	36.8	9.2		9.5	50.2	9.5		9.5	42.0	2.5		9.3	58.2	20.0		8.0	9 4.0	56.9	A
9.4	44.0	4.7		8.7	28 19.3	36.8	A	6.7	57.3	54.9	G	9.5	54 0.7	41.0		9.5	15.9	26.9	
9.1	58.5	48.6	A	8.1	21.0	28.2	A	9.0	44 2.3	33.9		7.7	16.1	10.9	G	8.2	19.1	39.8	A
9.4	18 12.1	33.8		9.5	21.5	2.3		9.0	53.1	30.3		9.5	17.3	11.9		8.8	40.2	14.3	A
8.9	17.0	26.3	A	8.5	21.7	39.0	A	9.4	45 17.8	37.1		9.3	31.7	49.1	B	7.5	41.3	41.9	A
9.5	19 22.6	14.0		8.8	40.9	15.5		9.3	18.5	15.5		9.5	35.9	45.3		7.1	47.7	52.5	A
9.5	25.7	40.5		8.8	29 18.5	34.8	A	7.4	46 23.7	56.7	A	9.5	55 37.4	25.6	R	9.4	10 0.8	52.0	
9.5	29.2	41.3		9.0	22.4	55.2		9.4	27.5	50.0		9.5	56 8.5	0.4		9.5	1.0	28.7	
7.6	32.5	40.0	A	9.5	33.9	39.8		9.4	33.8	52.4	B	9.1	23.6	37.9		9.5	29.5	25.2	
9.5	32.6	5.1		9.5	51.7	40.8		6.7	36.4	38.8	A	9.3	42.5	3.9		9.5	30.3	10.7	
9.4	42.8	39.7		6.3	53.5	19.4	A	9.5	36.5	7.2		8.7	43.5	10.0	A	9.5	30.9	50.7	
9.5	43.7	23.2		9.3	30 0.0	45.3		9.3	41.7	32.1	B	9.4	57.8	32.4		9.1	11 21.6	4.2	A
9.5	45.0	17.3		8.8	1.4	50.8		8.0	43.6	5.9	A	9.2	57 16.6	36.3	B	9.5	12 1.1	7.6	B
9.5	48.0	30.0		9.3	15.3	47.2		9.4	50.4	9.2		8.7	24.0	24.8		9.5	1.7	33.4	
9.4	55.2	53.7	B	9.5	40.1	1.3		9.0	53.1	22.9	B	9.3	36.0	19.0	B	9.4	58.2	19.8	
9.4	20 1.0	51.4		8.7	31 35.2	50.1	A	9.5	56.2	14.8		4.8	41.5	16.0	A	9.5	13 6.8	52.3	
9.4	3.0	45.4		9.5	47.3	21.5		8.3	57.0	3.6	A	9.1	52.8	58.2		9.3	10.0	30.5	
9.5	5.8	35.8		9.3	32 15.2	5.1		9.5	58.2	22.9		9.5	58 12.4	2.6	B	9.4	26.4	26.3	
8.5	19.3	6.7		9.3	22.1	9.8		9.5	47 0.2	14.5		8.9	24.1	24.1		9.0	31.4	2.7	A
9.1	31.8	55.0		9.4	33.7	22.7		9.5	33.0	43.3		9.5	27.3	18.8		9.0	14 7.5	19.2	A
9.3	45.0	34.3		9.2	35.6	23.8		9.2	41.7	49.0		9.5	42.5	42.5		9.5	39.0	38.0	
9.4	21 4.7	52.9		9.5	33 3.0	12.1		9.5	54.0	54.1		9.5	54.7	42.7		9.5	46.5	29.5	
9.5	23.8	55.7		9.0	36.7	51.1		9.1	57.8	49.1		9.5	59 3.6	29.9		9.5	47.9	54.7	
9.5	28.5	6.0		9.4	37.3	21.1		9.5	48 2.9	54.2		8.9	13.7	32.8		9.5	51.5	28.8	
9.1	39.3	56.4		8.1	34 6.1	32.1	B	9.1	11.5	31.6		9.4	17.8	7.0		9.1	58.2	29.2	
9.2	40.0	28.8		9.5	35 15.9	49.2		9.4	13.7	57.6	B	8.9	18.3	19.9	A	9.4	15 21.5	44.9	
9.5	54.0	38.9		7.5	17.2	20.0	A	9.5	23.3	9.3		9.5	27.0	38.5		9.5	24.6	2.0	
9.2	22 6.7	53.7		8.5	22.5	27.8	A	9.5	35.7	49.3	B	9.5	29.9	24.1		9.5	46.2	56.1	

4101—4148				4149—4196				4197—4244				4245—4292				4293—4339			
	23h	+49°			23h	+49°			23h	+49°			23h	+49°			23h	+49°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	15 52.5	35.2		8.0	26 6.9	33.3	B	9.5	35 37.3	56.0		9.2	43 16.2	52.3	B	9.4	51 8.6	45.7	
8.3	52.5	25.6	A	9.1	6.9	34.5		9.4	41.0	33.5		9.4	29.7	33.2		9.0	15.7	53.6	
9.5	16 7.6	19.4		9.2	17.3	21.9		9.5	36 16.4	59.1		9.4	31.4	5.8		9.5	39.1	54.1	
9.1	18.1	57.6		9.3	39.5	27.6		8.7	16.4	16.2	B	9.5	34.7	52.3		9.4	47.0	40.4	
9.5	26.2	5.5		9.4	40.7	39.6		9.4	32.3	31.9		9.5	42.8	33.8		7.2	54.6	43.2	A
9.5	55.5	43.0		9.0	47.4	10.3		9.5	43.1	55.8		9.4	45.6	14.2		7.7	52 1.7	41.9	A
9.5	17 0.0	12.7		9.4	27 19.0	18.7		9.5	49.2	46.3		9.1	52.0	22.8		9.5	15.5	13.0	
8.0	28.2	14.5		8.9	24.8	24.4	A	9.0	52.2	49.7		9.5	44 8.6	26.0		9.4	15.6	4.1	
9.5	30.7	29.9		9.4	29.0	49.1		9.4	37 8.7	33.7		9.4	35.2	17.4		9.3	21.4	18.0	
9.5	34.5	34.6		9.4	30.1	51.7		9.1	10.0	39.7		7.5	53.5	18.5	A	9.5	49.5	53.5	
9.5	36.5	21.9		9.4	47.2	32.4		9.3	26.2	13.6		9.4	54.1	5.2		8.5	50.2	58.7	A
9.2	55.0	15.9		9.4	49.3	30.0		9.2	48.8	17.9		9.2	45 20.0	34.7		9.5	51.5	56.5	
9.2	56.8	57.5		9.3	50.4	37.3		7.3	49.3	46.7	L	9.3	21.4	29.0		9.0	53 11.7	0.2	
9.2	18 0.6	37.7		9.4	55.0	51.8		8.9	57.2	58.3		9.0	56.8	59.2		9.5	32.1	8.3	
9.5	41.5	52.5		9.5	28 17.5	28.5		9.2	38 16.5	46.9		9.5	46 1.9	48.8		9.0	32.8	53.9	
9.5	45.0	41.5		9.4	18.2	12.7		9.2	19.0	41.8		9.5	10.3	4.7		9.0	49.2	34.0	
9.4	19 2.8	4.1		7.2	21.7	30.6	B	7.9	47.2	21.4	B	9.5	13.6	36.7		6.5	57.5	10.3	A
9.5	18.9	36.3		9.5	37.2	49.4	B	9.5	54.5	4.2		8.8	37.5	18.1		9.4	54 19.5	26.9	
9.5	45.5	5.3		9.5	45.3	0.7		7.0	56.4	51.5	A	9.1	40.8	2.6		9.0	25.2	24.5	
9.1	55.2	56.1		9.0	51.1	30.2	A	9.4	59.5	50.8	B	9.5	49.5	38.8		9.2	49.5	32.7	
8.7	20 0.1	20.3	A	9.4	29 3.0	38.4		9.4	39 3.4	10.3		9.4	47 51.4	5.5		9.3	51.1	57.5	
9.0	4.4	56.0		9.1	14.2	7.0		9.0	4.1	48.5	B	9.4	52.8	21.2		7.0	58.8	41.3	A
8.9	12.2	41.4		9.4	38.9	40.4		7.7	4.6	58.8	A	8.5	57.3	3.5	B	9.0	55 15.4	55.9	
9.5	30.5	27.9		9.2	30 6.8	13.0		9.5	10.2	1.2		9.3	48 1.8	49.6	B	9.4	19.6	40.3	
9.0	37.3	14.3	B	9.5	17.5	31.7		9.5	21.0	29.0		9.4	1.9	52.9		9.5	42.3	22.0	
9.4	38.7	50.9	B	9.2	45.1	10.7		8.9	32.3	9.5		8.0	4.2	26.2	L	9.0	59.2	5.7	
7.7	49.5	33.7	A	8.9	48.8	55.2		9.4	55.5	9.2		9.5	6.1	5.7		8.7	56 20.8	40.3	
9.2	55.5	1.9		9.3	31 3.5	0.0		9.5	57.1	39.2		7.7	13.3	31.2	L	9.1	30.0	59.0	
8.8	21 3.9	23.5		9.5	17.9	57.0		9.4	40 9.5	42.1		9.5	18.1	4.9		7.3	44.5	11.1	G
9.5	17.4	8.1		9.5	19.5	23.6		8.8	13.0	44.9	B	9.5	19.6	28.6		7.0	44.5	3.8	G
9.5	24.7	39.0		9.4	30.8	46.2		9.0	25.1	1.6		8.9	35.9	5.5		8.5	48.2	21.2	
9.5	22 16.3	6.8	B	5.7	32 7.6	40.1	A	9.0	25.8	10.2		9.0	36.0	43.6		8.9	49.3	38.9	
9.5	17.9	21.7		9.4	10.5	44.5	B	9.3	38.6	41.2		9.5	42.3	56.2		9.5	57 5.4	16.7	
9.5	23.2	2.4		9.5	55.0	3.9		9.5	40.0	54.0		8.7	43.5	32.8		9.1	6.5	8.7	
9.4	26.1	51.3		9.0	33 9.5	2.0		9.4	42.7	19.6		9.5	45.7	59.8		9.2	27.8	49.5	
9.4	45.3	21.4		9.0	12.8	58.5		8.0	53.7	29.9	A	9.5	49 12.3	3.9		9.4	37.9	7.7	B
8.2	23 2.5	58.4	A	9.1	23.0	6.7		7.9	41 8.4	3.8	L	9.5	26.9	49.6		7.9	58 2.2	42.8	L
8.5	41.7	3.8	A	9.0	39.5	38.7		8.7	9.8	48.8		9.4	27.7	16.2		9.3	9.4	4.7	
9.5	52.7	19.7		9.4	39.7	41.0		9.4	23.0	10.7		9.4	28.9	9.2		9.4	15.3	2.6	
9.2	24 2.0	7.3		9.4	34 4.5	17.3		9.4	29.5	24.8		9.5	39.0	31.3		9.2	28.1	29.3	
8.5	26.7	59.1	A	9.3	13.4	5.8		7.8	34.7	56.7	A	9.5	46.2	35.7		9.4	52.5	0.7	B
9.4	27.4	5.1		9.5	36.1	6.7		9.4	42 31.3	36.1		9.5	50 9.8	4.1		9.5	57.2	54.6	
9.2	29.5	19.6		9.5	45.4	24.5		9.5	36.4	6.7		8.9	15.6	38.5		9.5	59 5.4	43.9	
9.5	36.9	38.4		9.5	35 9.7	41.3		8.2	53.7	10.3	A	8.4	16.5	31.5	A	9.5	8.8	0.2	
8.5	43.8	52.3	A	9.5	17.6	5.5		9.4	43 3.9	1.7		8.7	31.4	44.0	A	9.5	10.8	44.1	
8.4	25 38.9	41.4		9.3	19.0	7.1		9.4	8.1	14.7		9.3	44.8	5.0	B	8.9	34.7	16.2	
9.0	39.5	4.2		9.3	19.5	7.8		9.0	9.4	28.4		6.7	47.6	37.9	A	8.9	39.8	5.7	
8.5	48.5	29.7		8.1	36.9	46.8	A	9.5	13.5	55.8		9.4	56.7	13.9	B				

Zone +50°

1—40				41—80				81—120				121—160				161—200			
	0h	+50°			0h	+50°			0h	+50°			0h	+50°			0h	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	0 17.8	21.9		9.4	9 35.7	41.7		9.4	21 16.6	6.7		9.3	32 5.0	10.5		6.7	42 41.7	43.1	G
9.0	18.7	24.3	R	9.5	36.4	27.2		9.1	21.6	29.8	B	9.2	15.4	2.0	A	9.4	48.8	3.5	
9.4	38.2	9.5		9.5	56.7	0.4		9.5	37.7	57.3		9.3	42.3	41.9		9.5	51.3	10.6	
9.1	44.1	11.1	R	9.3	56.7	8.6		9.5	37.9	18.8		9.2	43.5	24.3		6.7	43 18.7	46.9	G
9.5	55.0	4.8		9.1	57.3	14.8		9.5	22 5.8	3.6		8.7	52.0	11.3	A	8.3	25.1	24.4	
9.5	57.2	16.0		6.5	10 3.2	38.1	A	9.3	20.4	45.6		9.5	33 35.2	28.5		9.5	30.0	2.9	
9.4	1 2.0	46.8		8.7	11.4	16.3		9.1	23.5	40.5		9.5	34 25.4	6.3		9.5	57.7	44.8	
9.5	2.0	23.5		9.5	28.4	29.7		9.4	53.2	10.7		9.5	43.3	18.6		9.5	59.0	36.1	B
8.8	3.7	36.0	A	9.5	30.6	49.1		9.4	23 23.5	3.8		9.5	48.0	42.5		9.4	44 43.1	18.8	
8.9	40.0	1.4	R	9.4	11 15.9	7.6		9.5	55.9	43.4		9.5	51.0	51.0		9.5	57.0	33.7	
9.3	50.2	50.0		9.4	33.6	3.2		9.5	24 5.4	7.0		9.3	53.7	18.2		8.8	58.2	4.7	A
8.0	2 20.1	36.8	A	9.4	55.1	31.2		7.1	34.7	56.0	A	9.5	55.1	26.7		9.3	45 0.7	12.0	
8.4	34.5	0.0	A	9.2	12 8.4	13.7		8.0	38.2	18.1	G	8.4	35 26.2	59.2		9.3	9.3	12.2	
9.0	43.0	4.8	R	9.5	37.4	1.5		8.8	25 16.3	52.4		9.5	41.9	54.7		9.1	13.8	58.5	
9.5	50.4	47.1		9.5	13 31.9	5.6		8.4	26 14.1	11.8	G	9.4	36 17.0	8.7	B	9.2	57.7	20.5	
8.6	3 15.4	22.5	A	9.5	36.5	56.9		9.5	15.2	25.9		9.4	18.1	8.2		8.9	59.7	2.2	A
8.8	25.7	47.1		9.4	14 39.7	49.9		9.5	29.8	19.5		9.4	37 40.2	19.3		9.4	46 18.9	57.4	B
9.4	44.8	21.4		9.3	15 2.4	3.6		9.5	33.0	16.2		9.0	38 8.0	45.8		9.4	36.3	26.1	
8.9	48.3	2.5		9.4	16.7	7.9		8.9	39.6	39.2	A	8.8	32.7	54.0		8.6	40.6	25.0	A
9.5	51.7	17.7		8.3	26.8	57.9		9.5	42.3	23.1		9.4	33.8	57.1		8.8	48 38.2	36.7	A
9.4	54.0	37.3		8.8	31.9	23.6	A	9.5	27 0.4	54.1	A	8.2	39 15.9	18.5	S	9.3	43.4	54.4	
9.3	54.6	1.2		9.3	16 5.2	39.8		9.5	15.2	34.8		8.4	20.7	18.7	J	9.5	48.1	37.9	
9.4	4 5.4	14.6		8.8	6.3	51.0	A	9.0	41.3	3.0		7.5	48.7	39.2	S	9.2	55.2	30.4	
9.5	12.5	28.4		8.7	20.0	5.5		9.5	47.1	54.5		9.5	51.5	0.2	B	9.5	57.7	36.1	B
9.4	13.7	9.6		9.4	28.6	17.4		9.3	52.4	51.5	A	9.5	40 26.3	56.1		8.5	49 5.4	37.9	A
9.0	16.7	10.7	R	9.5	17 7.1	56.5	B	9.5	55.0	17.1		9.4	35.0	47.4		9.1	23.0	18.4	A
8.5	19.0	40.6	G	9.1	31.9	46.3	A	9.2	28 16.1	58.8	A	5.2	39.5	10.6	G	9.5	35.2	33.0	
8.0	5 16.9	41.0	G	9.1	35.2	8.1		9.2	28.9	10.4		9.1	44.6	59.9		9.5	50 3.9	27.9	
9.3	44.0	3.4		9.5	18 19.0	47.0		9.5	29 29.7	1.7		9.5	50.2	37.8		9.5	56.8	26.3	
9.5	6 5.7	35.5		9.4	23.3	21.2		9.5	40.0	55.4		9.4	54.2	28.2		9.4	51 2.5	6.3	
9.5	18.7	44.3	B	9.0	27.1	15.7	B	9.0	30 0.5	26.2	A	9.1	55.0	54.6		8.4	3.8	18.9	A
9.5	33.5	45.2		8.2	31.9	28.7		9.0	7.5	39.7	A	9.3	41 1.3	57.3		9.5	21.6	29.4	
9.5	44.8	27.0		9.5	19 9.4	36.0		9.5	8.0	29.9		9.4	12.0	25.0		9.5	41.1	7.0	
9.5	51.3	51.3		9.4	33.9	41.8		9.4	16.4	41.4		8.9	50.1	25.0		8.5	47.2	36.0	
8.1	7 4.8	48.9	A	8.9	51.6	39.6	A	7.7	23.9	28.3	A	8.9	52.3	28.7		8.4	57.7	49.3	
9.1	8.9	47.5	A	9.0	20 3.0	6.7	A	8.2	43.2	35.9	A	9.0	42 1.7	52.5		9.4	52 9.0	38.5	
9.5	40.0	6.1		9.4	14.2	16.0		8.5	31 5.5	13.9	A	9.5	13.2	29.2		8.5	16.7	31.9	
9.5	44.0	47.7		9.5	40.4	20.2		8.8	6.8	40.0	A	9.4	30.0	41.5		7.6	33.7	5.9	G
9.3	8 32.2	42.4		9.5	41.8	36.9		9.5	44.2	41.4		9.2	30.0	35.5		9.5	42.8	1.2	
9.5	9 3.3	43.9		9.5	59.4	58.5		9.5	54.3	52.2		9.2	30.6	38.7	B	8.3	53 24.5	15.6	L

201—260				261—320				321—380				381—440				441—500			
	0u—1u	+50°			1u	+50°			1u	+50°			1u	+50°			1u—2u	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	53 51.3	21.5		9.3	11 59.4	50.5		9.5	29 47.5	36.4		6.6	43 36.1	45.5	A	9.0	55 32.3	37.7	A
6.9	54.2	15.2	L	8.8	12 56.8	19.8	A	9.1	31 20.9	29.8		9.5	37.0	59.8		8.9	35.5	15.1	
9.4	54 9.4	17.3		9.3	57.4	22.8		9.0	22.0	11.0	A	9.5	52.9	52.7		9.4	49.6	48.5	
9.1	15.5	14.4	B	9.4	13 10.7	11.6		9.5	36.3	3.6		9.3	44 16.4	32.0		9.4	56 0.9	30.2	
9.5	55 4.2	7.9		9.5	56.4	47.5		8.5	41.0	16.2	A	9.1	22.4	4.8		9.4	5.8	41.4	
9.4	11.6	44.5		9.0	14 57.6	49.0		9.0	32 20.2	48.7	A	9.5	33.8	33.9		9.5	42.2	29.2	
9.2	13.9	22.4	B	7.0	15 26.5	24.8	G	9.5	26.9	13.6		9.5	58.0	31.5		9.4	44.8	28.2	
9.4	29.6	23.4	B	9.4	31.3	29.9		9.4	30.0	17.5		8.5	45 3.7	41.7		8.4	57 15.6	38.0	A
9.3	45.5	12.6		7.6	45.7	2.8	A	9.5	37.8	24.7		9.5	7.1	52.7		8.8	16.1	47.9	
8.3	56.3	26.7	B	9.5	48.3	15.2		9.4	33 0.5	13.3		9.0	25.8	23.5		9.0	21.7	55.3	
9.3	56 10.9	37.0		9.4	55.9	8.7		9.5	6.7	56.7		9.5	38.9	49.0		9.4	35.6	38.6	A
6.8	18.7	13.8	G	9.4	16 20.4	34.6		9.5	13.9	50.4		8.8	40.0	8.1		9.5	44.2	55.8	
9.5	34.5	11.9		8.0	30.6	55.5	G	9.3	32.5	40.8		9.5	46 11.9	41.5		9.5	57.3	54.2	
8.8	40.6	8.8		9.5	44.4	55.8		9.0	38.8	9.7		7.3	26.0	58.3	G	9.4	58 8.1	3.3	
9.5	48.6	58.7		9.5	17 22.5	34.0		9.5	34 26.1	16.5		9.5	44.8	16.4		7.9	13.2	24.3	A
8.8	57 21.3	32.8	A	9.5	54.4	52.0		7.0	30.4	47.4	L	9.5	49.9	30.0		9.5	59 21.5	30.5	
9.5	28.1	2.9		9.0	18 9.1	37.7		9.4	33.0	2.9		9.5	47 3.3	47.8		9.3	27.4	20.9	
9.5	45.0	48.3		9.5	22.4	0.3		9.4	35 6.4	35.8		9.5	26.7	59.8		9.5	35.7	59.9	
9.4	58 31.9	41.1		9.3	23.0	45.9		9.5	18.6	33.6		9.4	26.9	24.1		8.1	40.5	23.1	A
9.5	59 33.4	14.9		9.0	19 10.6	14.7		9.4	22.5	22.3	B	9.1	31.6	42.1		9.5	0 3.6	23.1	
9.4	53.8	37.6		9.3	11.5	24.5		9.5	28.9	29.0		9.2	42.3	32.1		9.4	5.0	38.0	
9.4	54.7	41.2	B	8.6	45.7	55.5	A	9.5	41.5	36.3		9.1	46.4	14.0	A	9.2	25.5	55.3	
9.5	0 9.5	24.3		9.4	20 0.6	51.1		9.5	36 3.9	13.8		9.5	47.6	59.9		9.0	27.2	58.5	B
8.5	59.5	48.2	G	9.5	0.8	28.5		9.5	16.0	20.7		8.6	52.7	4.1	A	9.4	48.1	25.9	
9.4	1 0.1	31.4		9.1	8.6	38.5		9.5	32.6	37.7		9.2	48 0.0	13.3	A	9.5	51.2	4.8	
9.5	27.5	13.8		6.8	9.1	56.0	A	9.5	33.9	43.2		9.3	9.0	23.5		7.2	1 10.5	22.0	A
7.3	33.7	58.1	A	9.3	49.5	5.2		9.5	44.0	26.5		9.0	14.9	25.2		9.3	25.0	35.2	
7.1	2 1.3	14.3	A	9.5	50.4	17.0		9.4	46.2	57.7		9.5	17.7	56.0		9.5	35.0	58.2	
9.5	13.0	9.5		9.3	21 2.3	2.0		9.5	37 31.8	12.8		9.1	20.8	53.3		8.7	40.5	55.3	A
9.0	15.7	53.8		9.4	28.5	11.6		9.1	40.3	35.2		9.4	41.6	13.2	A	9.1	53.6	26.5	
9.2	18.0	1.9		9.3	32.6	24.6		9.5	42.5	45.4		9.4	46.7	22.6		9.5	2 9.1	37.5	
9.5	3 0.9	45.5	B	9.1	54.9	47.6		9.0	49.1	23.5		9.5	49 19.5	42.4		9.4	19.4	4.2	
9.5	3.9	40.0		9.5	57.5	8.2		8.6	57.9	48.9	A	9.3	21.9	14.3		9.5	36.6	36.7	
9.4	12.6	2.5		9.5	22 25.4	18.4		8.6	38 6.5	7.9	A	9.1	23.9	14.8		9.5	51.6	21.8	
9.3	16.6	58.8		9.2	48.0	11.1		8.8	10.3	24.3	A	9.4	25.7	55.9		9.5	3 17.2	10.2	
8.2	42.9	45.1	A	9.3	55.6	8.8		9.4	15.1	29.4		8.6	31.9	10.3	A	9.4	20.0	6.8	
9.4	55.7	13.1		9.5	58.4	42.4		8.2	21.2	1.4	A	9.1	50 17.9	34.8		9.5	27.1	31.3	
7.0	4 16.7	50.3	A	9.5	23 25.9	24.5		9.4	39 1.0	24.5		9.2	54.2	5.0		9.5	37.7	10.6	
9.5	33.5	53.9		8.7	38.0	4.7	A	8.9	11.2	36.0		9.1	51 1.8	57.7		9.4	41.0	29.9	
8.9	36.9	19.2	A	9.5	24 3.0	43.8		9.2	21.4	23.8	B	8.8	31.7	40.5	A	9.4	44.9	53.6	
8.7	52.4	16.1	A	9.3	15.1	8.3		9.5	21.4	22.8		9.4	37.8	58.8		6.1	59.4	23.4	G
9.5	5 58.3	36.7		9.5	26.2	56.5		9.5	26.2	49.5		9.5	45.0	16.9		9.4	4 14.7	14.4	
7.1	6 48.6	58.4	A	9.5	30.4	39.2		9.3	32.3	45.9		9.2	48.3	58.0	R	9.3	21.2	12.4	
9.2	7 2.6	46.5	A	9.5	25 35.0	0.3		9.1	41.2	46.9		9.4	52 11.4	51.0		9.3	32.0	9.9	
8.5	6.7	6.2		9.5	38.8	47.5		9.5	40 1.1	17.4		9.4	27.5	52.8		9.5	35.4	43.6	
9.5	8 12.5	29.1		9.5	26 15.7	53.6		9.5	1.9	32.8		9.0	36.8	35.0		9.3	43.8	1.2	
9.4	38.6	56.7		9.5	29.8	53.1		9.5	19.8	33.9		9.1	53 1.8	35.7	A	9.5	45.5	15.6	
9.5	46.9	10.5	B	9.5	39.4	57.5		9.5	41 14.0	55.2		9.5	44.2	59.2		9.5	53.6	27.8	
9.3	48.6	30.8		9.5	43.9	36.7		9.5	20.3	32.2		9.3	54 0.7	5.8		9.4	56.6	48.5	
9.5	9 35.1	3.5		9.5	27 10.3	4.5		8.8	34.2	42.1		7.6	3.7	57.2	A	9.0	5 48.8	3.3	
9.4	51.8	45.9		9.5	28.5	39.1		9.5	43.4	53.5		9.0	21.8	51.3	A	9.5	52.4	46.1	
9.5	56.3	44.9		9.1	32.4	4.9		9.5	47.9	8.8		9.5	24.5	22.0		9.5	59.5	5.5	
9.3	10 6.0	35.5		9.0	48.3	55.8	A	9.5	56.1	33.7		9.5	31.0	10.0		9.5	6 13.8	28.8	
9.0	11.9	51.3		8.8	58.5	31.0	A	9.5	42 6.5	0.3		9.5	40.0	9.8		9.4	15.6	47.5	
9.2	35.9	2.3	B	8.9	28 9.1	35.0	A	9.5	11.5	10.5		9.4	40.5	5.3		9.2	41.5	36.7	
9.4	11 5.2	10.3		9.3	9.6	6.4		9.5	28.1	19.1		9.5	45.6	25.9		9.5	44.2	42.0	
9.5	28.1	48.7		9.5	30.4	3.5		9.5	29.9	7.3	B	9.5	51.6	1.9		9.3	53.1	49.7	B
9.4	44.6	8.9		9.5	35.4	50.4		8.9	41.1	28.6	A	8.4	54.5	59.6	A	9.5	53.3	51.0	
9.5	54.2	7.5		9.5	29 20.6	0.7		6.1	57.9	4.7	A	9.2	55 19.8	45.4		8.9	55.2	57.0	
6.5	56.6	50.5	A	9.5	24.8	43.7		9.1	43 20.2	48.7		9.3	32.2	34.0	A	7.5	7 12.6	51.2	A

501—560				561—620				621—680				681—740				741—800			
	2u	+50°			2u	+50°			2u	+50°			2u—3u	+50°			3u	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	7 23.5	30.0		9.4	19 33.5	4.2		9.3	35 7.7	53.1		9.2	51 4.9	4.4		9.2	10 18.8	32.6	
9.2	41.7	7.4		9.3	34.4	12.8		9.5	20.6	7.2		8.6	56.5	51.9		9.0	35.9	27.9	
9.4	44.3	38.0		9.2	45.6	46.8		8.5	26.8	58.0		9.5	52 3.5	30.6		9.5	42.5	13.0	
9.5	48.0	25.7		8.5	20 6.3	35.1	A	9.5	45.7	3.3		9.5	18.3	58.6		8.5	11 4.6	57.5	A
9.4	49.6	51.5		9.0	14.7	47.9		9.5	49.5	28.8		9.0	44.0	12.6		9.3	32.8	48.6	
9.4	8 2.7	0.9		8.9	19.0	56.5	A	9.5	36 12.3	50.0		8.6	56.5	51.4		8.8	34.5	34.2	A
9.0	11.4	11.6		8.4	32.2	29.8	A	8.1	25.3	0.7	A	9.2	53 16.4	26.5		9.5	39.7	39.4	
9.4	15.3	43.1		9.5	21 18.4	24.6		9.0	37 25.5	49.8		9.2	31.6	48.1		9.4	41.6	51.5	
9.2	15.3	31.6		9.5	22.1	47.1		9.2	51.9	51.0		8.7	44.5	22.9		9.5	12 26.3	18.8	
9.5	20.8	35.6		9.5	29.2	57.1		7.6	38 0.0	56.7	A	9.3	54 3.5	4.5		9.5	13 2.3	7.8	
9.5	22.1	34.4		8.6	30.7	40.2	A	9.2	3.1	26.4	B	8.8	20.0	47.7	B	8.6	11.0	8.4	
9.5	35.7	2.2		9.5	35.2	58.7		9.5	9.2	25.4		9.0	20.4	2.6		9.5	14 53.7	34.1	
8.7	9 3.6	13.4	A	9.4	22 10.6	13.0		9.2	15.5	55.8	B	9.3	33.5	42.2		9.2	54.6	16.1	
9.5	8.5	5.6		9.5	31.7	59.4		9.5	18.6	1.5		9.1	40.5	8.9		9.3	15 10.4	13.0	
9.1	24.2	5.0		9.5	48.8	1.5		9.2	21.0	56.0	B	9.1	56.1	25.5		7.6	32.7	53.6	A
9.4	33.6	24.8		9.4	23 7.4	13.9		7.8	30.2	16.7	A	9.5	55 12.6	46.6		9.0	37.0	50.8	
9.5	10 11.9	7.0		9.5	52.9	22.3		9.5	41.4	8.6		9.1	12.8	59.3		7.5	16 12.1	19.7	A
9.5	25.8	2.3		9.5	24 1.0	57.9		9.5	39 38.3	42.5		9.4	27.9	10.8		9.0	19.4	20.1	
9.5	29.8	7.2		9.1	7.2	9.2		9.5	40 23.1	38.0		9.5	33.7	28.2		9.0	44.6	21.8	
9.5	31.2	49.4		9.4	13.2	28.3		9.5	34.6	25.1		9.5	47.7	38.3		9.5	55.3	29.1	
9.5	32.1	55.0		9.1	26.4	48.3		8.6	41 8.0	12.3		9.0	59.0	32.1		9.4	17 15.4	50.4	B
7.0	33.0	16.8	A	9.5	39.5	13.9		9.1	17.7	43.0		8.8	56 2.5	26.3		9.5	19.5	49.1	
9.5	41.8	8.2		9.2	55.0	0.9		9.1	38.3	40.2		9.4	46.5	43.3		9.5	32.6	19.1	
9.0	49.2	53.4		9.5	25 2.0	34.4		9.5	42.0	18.9		9.5	52.7	25.6		8.1	38.5	25.8	B
9.5	11 1.5	19.3		9.4	12.9	39.0		9.5	45.8	12.8		9.5	58 1.7	17.7		9.2	54.0	17.8	
9.2	4.3	7.7		9.4	16.7	13.0		9.3	58.5	56.5		7.0	10.8	35.8	A	9.5	18 34.3	34.2	
9.5	13.2	0.2		9.0	21.8	33.0	B	9.3	42 2.5	55.5		8.3	59 5.5	1.0	A	9.3	19 5.2	56.2	
9.4	23.3	38.3		9.2	26 57.4	20.9		9.5	17.5	51.4		9.5	32.9	18.2		9.2	14.6	27.9	
9.3	43.5	10.3		8.5	28 20.7	14.0	A	9.5	40.7	34.6		9.5	0 0.3	21.6		9.5	19.4	8.3	
8.3	49.4	37.3	B	9.5	31.4	37.5		9.3	43 8.6	26.3	B	9.0	8.4	22.5	B	8.9	39.0	51.0	
9.1	53.9	51.9		8.2	57.0	7.6	A	9.5	12.5	15.8		9.5	17.1	51.0		8.6	20 15.2	31.6	
9.5	58.7	21.6		9.5	29 0.1	7.6		8.1	13.9	26.0	A	8.7	19.8	54.9		9.5	17.4	39.8	
9.2	59.5	50.8		9.3	1.3	12.7		9.5	44 6.1	15.7		9.5	38.2	38.9		9.5	28.8	24.4	
8.5	12 1.6	47.5	B	9.4	6.0	33.3		6.5	17.8	34.0	A	9.5	57.9	28.6		9.2	45.4	4.3	
9.1	2.0	14.6		8.9	23.1	9.4	A	9.5	23.5	44.6		9.0	1 6.7	46.4		9.5	21 11.0	1.5	
9.5	9.0	3.4		9.5	38.5	4.2		9.3	23.8	17.5		8.8	12.1	31.4		9.2	29.3	55.7	
9.4	9.7	49.5		9.5	30 13.5	45.2		9.5	40.6	4.8		9.5	43.0	30.8		9.0	47.0	55.9	
8.6	13 17.1	22.1	A	9.1	28.7	47.4		9.3	42.5	53.1		9.2	50.2	26.4		9.0	54.5	10.0	
9.1	35.6	7.6		8.5	29.0	59.9	A	8.5	52.6	23.1	A	9.5	52.0	4.2		9.0	58.0	59.4	
9.0	36.4	36.9	A	9.4	29.6	1.7		9.5	45 10.3	34.0		9.0	2 31.0	52.8		9.4	22 4.3	57.7	
8.5	14 7.9	14.1	A	8.5	38.5	59.8	A	8.0	22.7	28.7	A	9.5	3 34.8	31.0		9.5	21.4	2.1	
9.4	54.6	20.0		9.0	31 11.8	53.1		9.2	23.5	41.2		9.2	5 6.5	58.3	A	9.5	57.1	27.7	
9.5	15 24.6	47.8		9.5	18.5	55.8		9.4	30.0	15.4		8.5	11.9	22.6	A	9.1	23 14.3	1.2	
9.0	41.7	34.8		9.5	37.9	36.5		9.5	46 6.5	48.4		9.5	28.5	26.3		9.2	25.5	23.7	
9.5	16 0.1	20.9		9.5	50.5	35.6		6.5	43.0	40.3	A	6.7	29.2	24.9	A	9.5	34.2	13.2	
9.0	13.4	50.5		9.5	54.5	33.3		9.5	43.1	50.3		9.3	36.4	8.0		9.0	38.2	5.2	
9.4	46.3	12.3		9.4	54.7	18.7		8.5	43.8	12.0	A	9.5	38.5	27.1		9.0	24 15.0	14.0	
9.3	57.6	21.3		9.4	59.1	28.5	B	9.3	44.3	58.7		8.9	49.3	53.1	A	9.5	47.6	23.0	
9.3	58.5	58.8		9.5	32 18.1	32.0		9.4	56.8	29.1		6.0	51.7	23.5	A	9.2	25 48.2	57.5	
9.1	17 20.7	26.9		8.2	32.7	0.9	A	8.9	47 2.4	16.2		9.4	6 5.0	17.6		9.4	26 9.4	17.2	
9.5	21.0	33.5		9.2	38.2	39.3		9.0	5.7	24.5		7.6	26.2	40.5	A	9.5	41.8	35.3	
9.5	33.1	9.4		9.4	33 13.1	33.3		9.3	58.5	22.7	B	9.5	30.0	19.5		9.4	27 15.9	40.9	
9.0	18 3.8	47.6		8.4	34.5	55.1	A	9.3	48 4.1	40.8		9.2	49.9	38.6	A	9.2	28 6.0	39.4	
9.5	8.3	12.9		9.2	47.2	4.3		9.5	17.4	23.7		9.2	7 3.1	10.4		9.5	13.0	25.5	
8.5	16.2	17.5	A	9.4	59.0	9.3		9.2	42.0	45.4		9.4	11.1	10.7		9.5	35.2	25.9	
9.5	18.4	36.4		9.5	34 19.4	15.6		9.3	49.9	40.0		8.0	8 4.0	1.2	B	9.4	29 18.1	56.0	
9.0	50.0	37.7		8.5	19.9	35.9		9.5	49 5.1	51.7		9.5	9 7.7	35.7		9.5	30 37.7	45.9	
9.5	53.6	56.8		9.5	37.1	0.6		9.5	14.5	51.2		7.0	42.4	26.3	B	9.2	45.8	24.6	
9.4	19 19.5	21.2		9.5	55.0	24.3		8.9	31.6	47.6	B	9.4	52.1	11.8		9.2	48.5	15.6	
9.5	30.2	6.5		8.4	35 0.5	6.4	A	9.2	51 4.5	12.5		9.4	10 7.2	8.6		7.8	50.6	20.7	A

801—860				861—920				921—980				981—1040				1041—1100			
	3ᵐ	+50°			3ᵐ—4ᵐ	+50°			4ᵐ	+50°			4ᵐ	+50°			4ᵐ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.7	31 0.4	48.2		9.5	45 55.7	17.1		9.3	0 45.8	56.8		9.3	11 8.2	43.8		9.5	33 12.7	55.6	
7.5	59.3	42.3	A	9.4	46 12.6	16.7		9.5	1 18.2	52.8		9.5	20.9	39.2		8.4	26.2	5.1	A
9.0	32 35.5	21.7		9.1	24.6	38.2		9.5	21.8	18.4		9.4	27.9	25.8		9.0	35.4	15.2	A
8.7	42.0	53.0	A	9.0	32.6	25.9		9.5	24.9	53.4		9.5	46.3	3.9		9.4	38.9	55.5	
9.5	54.4	26.5		9.1	42.1	15.7		9.5	32.3	21.6		8.8	12 22.3	26.2		9.3	49.8	9.9	
9.5	33 14.4	51.0		9.5	47 30.1	56.3		8.0	41.9	47.2	A	6.9	13 32.9	30.2	A	9.5	57.2	18.4	
9.1	19.6	39.9		9.5	48 32.2	13.5		9.0	42.2	34.1		8.8	51.2	30.1	A	9.5	34 8.0	54.7	
9.5	55.2	16.1		9.5	34.0	50.7		9.5	2 2.2	0.9		9.5	14 12.5	47.6		9.1	18.3	11.9	
7.3	34 4.4	4.7	B	9.4	49 1.2	18.1		8.7	31.8	4.8	A	8.8	47.2	59.7		9.3	21.6	27.2	
9.5	13.5	51.4		9.4	2.2	26.0		9.5	39.6	37.6		9.0	15 3.1	10.2		9.4	58.1	44.5	
9.5	18.5	0.2	B	9.3	2.4	28.5	B	9.2	50.3	11.0		9.5	36.4	30.1		7.7	35 15.8	49.4	A
9.5	20.6	57.2		9.5	12.2	32.7		8.0	3 2.9	6.1	A	9.1	46.1	53.7		9.5	20.9	0.1	
9.5	33.8	12.9		8.7	50.0	47.6	A	9.5	12.1	31.7		7.9	56.3	52.4	A	9.2	26.0	22.1	
9.5	35 17.6	13.5		9.0	51.7	50.3	A	9.4	42.6	19.2	B	9.0	59.2	21.6	A	8.1	30.8	56.1	A
9.5	17.7	51.8		9.5	50 5.4	16.2		9.4	48.2	50.6		8.6	16 26.5	23.0	A	8.0	36 28.9	17.5	A
9.0	58.4	45.0		9.3	44.6	41.8		9.5	49.4	45.3		8.5	34.4	55.3	A	9.3	35.0	8.0	
9.5	36 1.3	18.9		9.5	44.9	42.1		9.5	56.2	48.1		9.0	17 17.4	21.2	A	9.5	36.0	22.9	
9.2	3.6	41.7	B	9.0	50.0	18.5		9.5	56.8	47.6		9.5	20.8	16.6		8.9	38.8	56.4	A
9.2	5.7	40.9		9.5	54.0	24.4		9.5	57.4	19.6		9.0	22.9	56.8		8.2	55.9	27.3	A
9.5	44.0	44.8		9.5	55.4	5.0		8.8	58.6	52.0		9.5	18 14.0	10.7		9.4	37 12.9	6.8	
9.5	56.8	43.3	B	9.5	51 2.8	38.6		7.4	4 7.5	18.6	A	9.5	22.0	8.4		8.8	28.8	21.6	A
9.4	37 4.2	9.6		8.0	3.0	13.5	A	9.3	11.6	52.0		8.6	30.1	16.8	A	9.1	29.9	40.8	B
9.5	33.0	9.5		9.4	5.1	4.0	B	9.3	12.2	49.4		9.2	48.2	20.4		9.2	40.6	21.0	
9.4	34.4	49.3		9.4	52 9.0	8.6		9.2	16.3	29.1	A	9.5	19 16.2	47.9		9.3	38 4.8	49.6	
6.0	39.5	16.7	A	8.6	20.7	11.8	A	9.4	17.7	47.0		9.5	18.0	49.6		9.3	5.5	58.1	
9.5	53.3	20.8		9.5	24.0	55.3		8.8	22.1	29.0	B	9.2	25.4	35.9		9.4	27.4	52.0	
9.5	54.4	21.0		9.5	56.6	25.5	B	9.5	23.2	50.9		9.5	31.9	16.2		9.0	41.6	9.3	A
7.0	55.5	55.7	A	9.3	53 36.2	3.1		9.5	25.1	49.3		9.4	20 18.8	48.0		9.5	45.8	16.3	
9.0	57.9	23.7	A	9.0	57.8	40.1		9.5	26.8	8.4		9.2	42.8	4.8		9.4	39 17.8	41.3	
9.3	38 6.0	18.3		9.1	54 2.2	14.0		9.5	34.2	49.4		9.4	21 13.7	26.7		8.0	32.9	8.9	A
7.1	12.8	23.7	A	9.4	4.0	26.1		9.5	40.7	58.2		9.5	20.5	45.9		9.3	48.9	7.3	
8.7	16.5	14.9	A	9.5	6.5	9.9		9.5	45.3	45.2		9.5	39.5	6.3		9.2	40 6.0	13.7	A
9.5	38.2	17.3		9.4	9.1	7.0		9.3	51.9	44.9		7.5	22 10.7	43.9	A	9.3	38.8	25.2	
8.0	42.3	28.8	A	9.0	18.4	40.3		9.5	52.0	54.1		9.5	21.9	2.2		9.2	40.0	15.9	A
8.8	59.8	44.9	A	9.2	29.6	14.1		9.2	5 4.2	28.2	A	9.0	40.1	48.6		8.8	41 2.7	33.5	
9.0	39 25.2	18.7	A	8.6	47.2	21.5	B	9.5	6.1	50.2		7.5	23 34.0	41.2	A	8.4	15.5	32.1	
9.4	33.5	10.4		9.4	52.2	21.1		9.5	6.7	22.0		9.5	42.4	41.6		9.2	31.8	57.0	
9.5	40 9.6	41.1		9.4	53.3	28.0		9.3	20.2	2.5		9.5	24 24.0	6.7		9.5	42 23.2	0.3	
9.2	16.4	37.8		9.4	55 12.1	55.2		9.1	24.9	22.1	A	8.9	45.8	18.1	B	8.7	31.8	21.8	
9.0	25.3	54.5		9.1	21.2	1.2		9.4	34.7	43.0		9.5	25 41.0	5.2		9.2	35.0	14.7	
8.5	26.0	39.7	A	8.9	56.8	10.6		9.5	41.4	14.8	A	9.4	26 57.2	52.3		9.1	42.1	35.7	
9.5	38.1	38.5		9.5	56 16.6	45.2		9.1	49.0	56.2		9.5	27 1.9	14.1		8.8	44.9	21.7	
9.2	38.7	4.8		9.5	43.7	57.6		7.0	6 16.8	29.9	A	9.3	14.4	12.0		9.5	59.8	17.0	
9.4	50.0	16.4		9.0	50.1	24.8		9.4	33.4	15.2		9.5	28 20.8	49.4		9.5	43 40.8	46.6	
9.4	41 14.1	31.9		9.5	57 3.7	29.5		9.2	35.5	26.9	A	9.5	23.4	23.4		9.3	44 6.3	21.8	
9.5	22.0	56.2		9.4	23.6	12.9		9.0	40.1	35.5	A	8.1	32.8	54.9	A	9.5	9.4	27.2	
7.7	24.8	20.4	A	9.5	31.1	44.3		9.4	56.6	25.5		9.4	33.6	56.5	B	8.9	11.9	17.2	A
8.8	41.9	56.0		7.7	35.3	33.0	B	9.5	59.0	56.6		8.0	29 6.7	49.2	A	9.5	31.0	57.7	
7.4	42 14.0	36.6	A	9.4	58 9.7	47.9		9.5	7 8.0	26.4		9.4	15.8	35.2		9.2	35.9	32.2	
9.5	36.1	38.0		9.5	13.6	8.9		9.2	24.8	33.5		9.4	30 2.0	54.1		9.5	45 44.8	36.9	
8.3	57.8	30.8	A	9.5	33.4	57.2		8.2	8 17.9	59.7	A	9.5	26.7	54.7		9.0	53.2	56.3	A
9.3	43 15.1	4.7		9.5	39.7	4.1		9.2	52.6	34.0		9.4	37.2	21.7		9.5	46 13.8	52.1	
9.5	44 10.0	9.1		9.2	45.5	20.7		6.1	9 13.5	33.7	A	9.4	31 3.8	48.4		8.8	32.9	44.7	A
9.5	39.2	6.2		9.5	59.0	10.3		9.5	23.1	49.8		9.1	7.9	47.6	B	9.3	37.0	5.4	
9.2	45 8.6	13.1		9.5	59 16.7	30.4		8.5	44.2	45.6	A	9.3	26.8	15.6		9.5	47 0.8	40.7	
9.5	10.8	14.8		9.2	31.2	13.3		7.8	59.4	1.3	B	9.4	34.7	50.2		9.5	0.8	24.6	
9.4	17.6	34.6		9.4	50.9	34.4		9.5	10 36.4	55.1		9.4	52.4	33.1		9.3	9.7	47.3	
9.5	27.1	34.0		9.3	53.5	59.6		9.5	49.5	27.1		8.9	32 8.4	29.6		9.5	48 3.5	57.9	
9.2	30.6	42.1		9.4	59.8	21.2		9.5	56.8	36.2	B	8.7	11.8	30.6	B	9.5	49 0.0	37.2	
5.7	51.3	16.3	A	9.5	0 34.1	57.2		8.8	11 5.6	40.0	A	9.5	57.6	21.0		8.4	6.3	0.4	A

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	4ᵐ—5ᵐ	+50°			5ᵐ	+50°			5ᵐ—6ᵐ	+50°			6ᵐ	+50°			6ᵐ—7ᵐ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	49 34.0	55.5		8.7	12 38.2	19.4	A	9.5	32 55.8	15.0		8.7	1 21.2	37.9	B	8.9	31 45.8	27.4	
9.4	38.8	58.8		9.5	51.9	44.0		8.8	33 49.0	39.6	A	9.4	27.0	29.0		9.2	50.7	43.4	
8.5	50 11.8	2.1	A	9.5	13 17.6	6.2		8.4	34 29.0	34.0	A	9.5	2 43.0	22.2		8.5	53.9	11.5	
9.5	24.0	53.4		9.5	22.1	1.6		9.5	35 5.4	37.2		9.5	44.3	33.6		9.5	58.7	42.4	
9.0	28.0	30.3		9.1	22.5	57.6		7.1	36 3.3	1.5	B	8.8	3 8.4	49.4	A	9.5	32 5.8	40.0	
8.9	40.4	47.3		8.3	35.3	50.4		9.5	32.4	12.5		9.5	23.2	10.0		8.2	32.3	17.0	B
8.5	57.0	2.1	A	9.5	48.9	38.2		9.5	33.7	48.5		9.4	46.0	18.3		9.5	33 25.3	59.3	
9.0	51 12.0	15.6		9.2	51.4	13.7	A	9.5	40.0	34.0		9.4	4 1.1	14.0		9.3	35 3.9	4.7	
9.0	30.4	18.4		9.2	14 46.5	53.0	A	8.5	57.6	57.8	A	9.5	42.2	20.2		7.3	6.3	31.4	A
8.2	36.6	23.3	B	9.3	50.0	44.0		9.4	37 12.2	39.7		9.5	5 2.1	52.2		8.8	37.3	55.2	B
9.0	52 7.0	48.2		9.5	15 3.4	3.3		9.0	48.9	33.0	B	9.5	52.8	26.7		9.5	36 1.8	56.3	
8.9	10.1	24.9		8.4	26.5	8.5	A	8.7	49.6	2.2	A	9.4	7 17.7	0.4		9.5	2.9	41.6	
9.4	28.5	48.6		9.5	49.6	40.0		9.0	38 26.6	24.1		9.5	48.0	40.1		9.0	38 28.6	59.9	B
9.4	54.6	48.6		9.5	16 18.5	37.4		9.5	32.7	0.0		8.8	9 17.4	2.1		9.1	58.7	47.5	
9.0	53 2.7	17.2		8.9	29.1	1.3	A	9.2	39 31.6	39.3	B	9.4	10 5.9	28.7		8.7	39 18.3	46.4	B
8.5	32.9	7.7		9.4	49.6	21.1	A	9.5	51.1	11.0		9.0	11 49.8	28.0		8.8	18.4	17.9	
9.2	54 0.4	48.5	B	9.3	17 5.5	28.1	A	9.5	40 0.4	29.1		7.9	59.1	49.8	A	9.4	40.9	44.9	B
9.2	0.8	9.3		8.7	7.5	49.4	A	9.4	2.0	35.3	B	8.5	12 3.0	58.9	A	8.5	40 8.2	41.9	B
9.2	10.6	12.6		9.5	18 53.2	54.0		9.0	55.0	22.8		9.4	23.6	52.0		9.4	16.3	49.7	
9.3	57.2	0.8		9.4	19 29.0	4.9		8.5	41 10.8	43.5	A	9.0	40.8	5.5		9.4	59.9	46.6	
9.1	55 47.3	21.0	A	9.3	37.5	43.2		8.3	47.8	15.4	A	8.9	50.9	5.0		8.5	41 2.5	50.2	
7.5	56 12.9	5.3	A	9.5	20 14.2	35.1		9.0	42 20.9	7.6	A	9.4	13 32.4	38.2		9.2	17.8	39.4	
9.2	35.8	56.3		8.1	27.0	15.3	B	8.3	31.6	41.9	A	9.5	14 2.1	52.2	B	9.1	17.9	6.0	B
9.4	42.5	59.8		7.0	31.7	53.9	A	9.3	43 5.7	31.6		8.9	16.9	10.9	A	9.5	43 0.0	59.7	
9.0	45.2	26.2	A	9.1	21 3.8	0.2		9.5	49.1	37.0		9.5	53.0	30.0		9.4	0.1	38.2	
9.4	58.8	27.6		9.5	18.2	21.3		9.0	44 6.7	0.5		9.3	15 0.3	27.8		9.5	19.5	32.7	
9.3	57 14.4	34.7	A	9.2	32.1	12.5		9.0	42.5	31.6		9.4	8.0	49.0		7.5	21.4	11.4	L
9.5	34.0	41.6		8.5	39.3	26.2	A	9.2	55.2	32.2		9.0	16 48.4	13.8		8.2	56.5	45.3	A
9.4	59 54.5	56.0		9.3	42.7	21.5		9.3	45 6.5	43.0		9.0	17 2.4	20.7		9.3	45 3.9	22.8	
9.5	0 40.5	33.2		9.5	22 21.1	16.0		8.8	52.5	19.9		9.2	19.3	36.9		9.0	14.6	22.3	
9.5	1 37.7	37.0		9.2	28.2	0.2	A	9.2	56.4	53.6		9.5	18 6.4	32.9		9.4	32.0	10.0	B
9.5	2 0.8	38.9		9.2	23 34.1	18.5		9.5	46 6.1	34.3		9.3	45.7	59.5	B	9.0	35.6	21.3	B
9.2	33.5	50.4		9.4	57.1	20.4		9.5	44.3	0.3		9.1	19 23.9	19.8		9.1	39.5	11.3	B
9.2	48.4	28.7		9.5	24 7.0	30.3		9.5	47 25.1	18.0		8.5	20 24.0	48.7	A	9.1	42.3	44.8	
9.0	3 37.3	44.0		9.5	12.3	10.2	B	9.5	47.9	51.3		9.5	26.3	39.0		8.9	46 2.4	5.0	
7.7	4 29.3	23.0	A	9.5	39.7	26.2		9.4	48 35.8	26.7		8.2	41.0	44.0	A	9.5	9.0	57.6	
9.2	33.7	59.5	B	9.5	25 18.6	52.8		9.5	50 48.9	22.3		9.4	47.9	11.4		9.5	47 25.5	6.5	
9.2	51.4	25.7	A	9.5	31.7	27.3		9.1	55.0	29.4		9.4	55.4	2.3		9.5	48 10.3	59.7	
9.5	57.0	57.8		9.5	35.6	12.5		9.5	51 21.3	33.0		9.2	22 31.8	7.0		9.5	49 37.8	29.6	
9.5	5 0.3	35.7		9.5	42.6	3.7		9.5	57.0	28.7		9.3	24 57.4	31.1		9.0	50 17.2	9.0	
9.5	49.9	36.7		9.1	26 31.4	48.2		9.3	52 15.4	43.9		9.1	25 6.6	48.4		8.5	51 1.4	1.6	A
9.5	55.8	20.4		9.3	54.2	47.9		8.5	20.7	36.4	B	9.2	14.5	38.5		8.5	5.9	17.3	A
9.2	6 5.3	25.7	A	8.0	56.8	25.6	A	9.0	27.1	14.3	A	9.3	17.2	43.3		8.5	20.3	51.8	A
9.3	7 28.4	8.2		8.5	58.8	59.9	A	9.0	53 22.2	54.2		8.9	26 26.8	11.4		9.0	32.9	29.3	
9.3	42.5	48.7		9.3	27 8.9	53.4	B	9.0	28.1	44.5		9.5	35.7	53.9	B	8.6	35.9	9.5	A
9.2	46.9	5.2		9.0	10.7	58.1	B	9.5	55 4.6	40.1		9.4	42.8	57.7		9.5	57.0	31.9	
8.9	47.1	31.8	A	9.4	11.5	48.4		8.2	34.7	4.2	A	9.4	43.4	50.1		9.0	52 15.5	21.2	
9.5	48.5	49.1		8.5	23.6	16.0	A	9.5	54.7	59.2		9.4	48.5	40.9		9.1	33.9	13.3	
8.0	8 31.2	51.0	A	9.3	28 12.1	4.2		8.2	56 43.4	35.4	G	7.9	27 0.7	39.7	A	9.0	53 4.9	9.0	
9.5	9 10.1	0.2		9.3	13.9	26.5		9.0	57 0.4	22.2		9.5	22.8	1.5		9.1	54 35.3	48.3	A
8.5	34.9	28.2	A	9.1	40.9	44.5		9.0	3.4	45.0	A	9.4	44.8	19.1		9.5	55 15.4	2.1	
9.0	56.0	14.0		9.1	29 21.6	19.9		9.2	22.9	58.1	B	9.4	45.4	33.7	B	8.5	56 32.5	31.3	
9.5	10 20.8	29.7		9.4	35.9	19.3		9.5	37.2	17.2		9.5	29 9.9	28.3		9.5	57 23.8	57.6	
9.3	25.9	31.8		9.5	31 6.0	26.4		9.0	41.7	52.8		9.0	34.3	15.0		9.4	58 21.4	30.0	
9.3	34.6	51.2		9.5	46.3	8.2		8.5	58 41.4	10.5		8.5	30 3.8	11.5		9.5	34.0	58.1	B
8.9	11 3.7	20.8	B	9.5	56.7	25.8		9.5	59 17.2	39.6		9.5	42.0	6.0		9.4	59 12.9	21.9	B
9.2	35.6	21.2		9.4	57.6	32.6		9.5	25.1	41.0		9.5	46.0	45.7	B	8.0	13.4	9.4	A
9.5	53.9	21.0		7.0	32 3.6	37.2	A	9.5	0 15.7	41.0		9.4	49.9	45.6	B	9.5	53.3	41.4	
8.2	12 16.1	4.9	A	9.1	16.9	58.2		9.5	20.3	31.3		8.6	50.6	26.7		7.5	57.2	7.9	A
8.8	21.5	30.2		8.0	48.6	43.0	A	9.5	59.2	52.2		9.0	31 13.7	45.4	B	9.4	0 21.9	37.5	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	7ᵘ	+50°			7ᵘ—8ᵘ	+50°			8ᵘ	+50°			8ᵘ—9ᵘ	+50°			9ᵘ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.0	0 52.3	1.0	A	9.5	33 13.0	24.5		9.2	3 53.3	4.3		9.3	42 4.2	18.3		9.1	17 30.0	4.1	A
9.0	57.8	33.4		9.4	50.7	5.7		9.1	4 22.5	31.4		7.7	21.8	29.5	A	9.3	18 43.2	30.2	A
9.5	1 49.0	27.5		9.5	34 45.8	3.1		9.5	41.0	50.5		8.9	49.1	54.5	A	9.0	19 5.7	42.5	A
8.6	2 10.7	10.3	A	9.5	52.5	27.0		8.3	5 19.2	11.8	A	9.3	43 3.2	43.0	A	7.7	6.4	39.1	A
8.2	29.1	48.0	A	9.2	55.5	16.0	A	8.4	22.0	20.7		9.3	6.7	54.0	A	9.5	17.9	0.2	
9.4	3 38.6	36.8		9.5	35 13.6	27.5		9.5	6 25.2	51.4		9.4	40.1	1.2		9.4	23.7	58.8	
9.0	4 33.8	2.5	A	9.3	56.3	39.6		9.0	7 5.0	33.0	B	9.4	44 21.9	32.2		9.2	20 34.8	21.0	
8.3	58.9	20.7	A	8.7	36 18.9	26.7	A	9.5	9.3	34.2		9.1	22.1	26.9	B	9.5	21 4.6	53.4	
9.5	6 58.0	15.7		9.5	53.0	22.4		9.4	8 5.2	3.4		8.5	33.2	48.0	A	9.1	32.4	53.0	A
9.4	7 7.0	20.0	B	9.4	53.2	33.9	A	8.1	9 3.8	44.2	A	9.5	45 7.8	2.1		9.5	34.1	16.0	
7.8	11.1	45.2	A	9.5	37 8.9	34.5		9.5	11 3.3	13.2		8.9	25.8	23.9	A	9.3	34.5	4.6	
9.1	33.3	33.1		7.1	30.7	4.1	A	8.7	10.7	46.9	A	9.3	47 23.3	31.8		9.2	47.2	31.6	A
8.7	8 27.1	4.6	B	9.5	38 21.5	11.5		9.1	51.3	23.7	A	9.3	28.4	15.0		9.2	55.3	1.2	
9.1	35.4	18.8		9.5	39 21.7	37.9		8.9	12 29.8	35.0		9.5	48 35.7	46.0		9.1	22 21.3	13.5	
9.5	9 8.8	29.1		8.6	29.4	56.9	A	8.5	13 32.8	36.6	A	9.3	49 27.6	12.1		9.1	47.3	6.6	
9.5	49.5	16.9		9.5	43.3	29.1		9.2	14 16.2	46.4	A	8.7	34.7	17.5		8.9	54.7	47.4	A
9.3	10 13.6	16.7	B	9.1	48.7	48.0		8.5	18.3	11.3		9.3	41.8	4.6		6.8	23 22.3	4.6	A
8.5	42.3	3.0	A	8.6	40 17.5	1.9		7.5	16 27.1	2.4	A	8.8	50 43.1	26.3		9.1	58.8	14.1	A
9.5	54.7	57.5		9.5	41 20.0	15.0		8.0	44.4	24.1	A	8.2	51 26.2	17.1	A	8.8	25 20.2	54.4	
7.2	11 10.3	25.2	S	7.5	25.3	0.6	A	8.8	17 10.9	16.2	B	8.5	26.6	20.6	A	9.1	30.6	37.2	A
9.5	24.1	29.0		8.9	37.5	31.6	A	9.5	36.5	35.8		7.2	52 52.9	31.9	A	9.1	53.1	43.1	A
9.0	44.0	2.0	A	8.5	42 20.9	38.7	L	7.8	50.2	10.8	A	9.3	53.7	36.0	B	9.5	27 13.5	40.2	
9.3	58.0	46.7		9.5	37.9	35.4		9.0	18 38.4	39.6		9.2	53 2.0	39.1	A	9.2	31.9	13.6	A
9.4	12 36.7	11.3		9.5	49.0	11.0		8.5	39.0	53.6		9.1	54 36.7	47.0	A	9.2	28 37.8	15.6	
9.5	50.6	39.4		7.5	43 55.6	9.4	B	9.1	47.8	25.1		9.1	48.1	28.6		8.0	38.9	32.3	A
8.8	13 31.8	10.3	A	9.3	44 2.4	58.5		8.0	20 10.0	46.1	A	8.5	55 19.2	52.4	A	8.0	57.7	54.0	A
9.5	14 57.3	30.8		9.0	18.6	8.2	B	9.5	43.9	31.6		8.1	27.2	52.4	A	9.3	29 17.8	27.3	
9.0	15 0.7	37.7		9.5	32.2	8.9		9.4	56.5	46.1		7.5	56 15.8	12.0	A	9.5	30.2	5.1	
9.5	16 12.2	11.8		8.4	45 12.4	55.0	A	9.5	21 2.3	22.2		9.5	57 8.6	23.5		9.5	50.4	22.0	
9.5	16.1	27.0		9.5	40.0	39.7		9.4	5.5	4.6		9.1	16.4	15.0		9.2	31 46.0	0.6	A
8.3	17 35.8	40.8	A	9.5	50.0	22.0		9.5	31.5	17.6		9.5	58 45.2	51.5		9.5	47.6	57.3	
8.3	58.3	24.2		9.5	46 13.5	46.1		9.5	22 17.1	35.7		9.0	59 26.1	3.1		9.5	53.8	18.8	
9.0	18 34.8	14.7		9.5	14.6	42.5		9.0	56.5	42.6		9.5	40.3	53.4		8.8	32 31.3	0.7	A
9.0	35.2	58.9	A	8.5	47 22.0	15.0	A	9.5	23 29.0	55.1		7.7	47.5	25.3	A	9.4	33 45.4	10.0	
8.8	51.8	15.3	S	8.7	30.3	38.3	A	9.3	24 10.0	37.1		9.5	0 13.8	36.2		9.5	51.2	28.5	
8.0	19 16.0	16.2	S	9.5	48 20.6	23.9		8.5	28.9	56.6	A	9.5	30.2	44.0		9.5	34 4.3	41.4	
7.8	37.5	14.3	A	9.5	24.3	38.8		8.4	38.1	52.6	A	9.0	1 4.2	47.9	A	9.0	10.2	58.7	A
9.4	51.3	58.1	A	7.5	29.0	43.8	B	9.5	25 34.9	1.4		9.1	2 1.8	28.6	A	9.5	42.8	14.0	
7.8	20 2.3	20.5	A	9.5	35.0	4.6		9.5	26 44.3	13.8		9.4	4.6	1.1		9.5	43.1	55.0	
9.5	37.8	58.1		9.3	50 2.8	45.0		9.4	28 50.5	47.2		9.5	7.3	26.5		8.5	43.4	4.6	A
8.0	53.9	26.0	A	9.5	52 30.0	22.4		9.5	29 1.4	54.2		9.2	51.8	21.4	A	9.4	36 47.8	0.2	
9.5	21 7.7	26.8		9.4	30.9	30.1		9.2	9.6	56.1		9.5	52.5	31.9		9.5	57.9	19.6	
9.5	27.0	5.1		8.5	53 38.8	30.9		9.5	36.5	16.4		9.1	3 25.4	3.6	A	9.5	38 0.1	24.6	
9.4	54.4	48.0		8.5	50.9	50.1	A	9.5	53.7	20.4	B	9.3	46.5	32.6		9.5	16.3	6.1	
9.0	22 22.9	27.4	A	8.0	57.4	38.9	A	9.4	59.2	18.5		9.5	55.5	37.2		9.5	45.8	19.5	
9.4	30.7	45.7		9.3	54 3.1	27.5		9.3	30 2.8	20.5	B	9.1	4 51.2	33.3		9.2	52.4	2.1	
9.5	23 39.2	32.0		9.5	17.1	51.1		9.5	55.1	52.6		9.5	7 15.3	27.0		8.6	39 37.7	51.2	A
9.5	24 26.5	35.2		8.0	56 18.5	19.0	A	9.4	31 55.3	6.0		9.5	9 33.2	48.4		9.2	41 47.7	43.0	A
9.1	25 43.2	49.1	A	9.4	27.5	51.5		9.4	32 10.2	33.5		8.9	10 31.2	13.0		7.5	42 23.1	17.1	A
8.9	26 3.8	55.3	A	9.3	45.8	0.7		9.5	15.4	13.4		9.5	11 33.6	12.1		7.5	25.5	25.3	A
9.5	39.3	27.4		7.1	57 18.1	33.4	A	8.4	40.1	31.2	A	9.3	34.6	42.6	B	9.3	32.6	12.9	B
7.2	28 20.8	50.1	A	9.5	44.0	20.4		9.5	42.2	51.0		9.5	12 36.4	37.8		8.4	37.1	38.2	A
9.4	35.7	7.9		8.4	59.3	7.9	A	8.5	35 58.1	32.8	A	6.8	36.4	8.1	A	9.5	43 1.0	5.1	
9.5	29 16.3	43.5		9.5	58 26.8	30.6		8.3	37 36.7	48.9	A	9.5	14 20.2	27.3		9.5	44 44.0	13.6	
9.5	30 10.5	15.0		9.5	59 22.7	12.2		9.4	56.9	7.0		7.5	49.7	53.9	A	9.5	46.0	38.8	
9.5	20.7	4.0	B	9.0	1 12.3	0.5		9.4	38 49.2	44.5		8.9	51.6	47.5	B	9.5	52.8	12.6	
8.8	31 10.3	53.8	A	7.7	51.1	25.5	A	9.5	40 7.8	23.4		9.3	54.6	49.5		9.1	45 24.7	58.4	
8.9	37.5	29.4	A	9.5	56.8	49.8		9.1	10.9	10.5		9.1	16 16.7	13.6	A	5.6	46 14.8	30.5	
9.2	32 40.5	24.2		9.4	2 28.8	32.7		9.5	41 2.5	45.4		9.5	57.8	28.9		9.3	30.0	42.5	
5.8	33 4.7	45.5	A	9.1	3 20.8	6.4		8.3	43.7	56.4		8.0	17 3.4	19.5	A	9.4	33.3	27.	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	9ʰ—10ʰ	+50°			10ʰ—11ʰ	+50°			11ʰ	+50°			11ʰ—12ʰ	+50°			12ʰ—13ʰ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	48 9.3	59.7		8.9	35 14.3	11.1	A	9.5	20 1.4	38.1		8.3	52 58.8	23.6	A	6.5	34 43.6	5.5	A
7.0	49 18.0	49.9	A	9.2	45.4	54.9	B	9.1	44.8	22.0		9.5	53 50.0	10.9		9.4	54.0	28.5	A
8.7	50 25.5	40.0	A	7.8	51.2	12.1	A	9.5	21 7.6	8.2		9.4	54 27.4	5.4		9.0	36 16.0	2.3	A
8.9	51 8.5	45.4	A	8.5	36 56.2	14.6	A	9.5	12.4	5.9	B	9.4	40.0	18.4		9.3	56.7	29.1	A
9.1	52 49.0	22.3		8.0	37 10.8	11.1	A	9.4	15.9	37.9		9.5	55 11.9	46.3		9.3	38 8.3	57.4	
7.5	53 27.0	33.6	A	9.3	37.9	4.7		9.0	22.0	1.6	A	9.5	36.2	10.1		9.0	39 17.9	36.7	A
6.7	51.5	48.9	A	9.5	56.9	24.4		9.5	22 17.9	25.6		9.2	44.1	12.1	B	9.1	40 39.3	55.9	A
9.5	54 12.5	50.4		9.5	39 8.0	28.1		9.3	23 7.9	29.2		9.5	56.8	3.5		6.5	41 11.2	56.9	A
9.5	19.0	11.4		9.5	16.6	41.7	B	9.5	24 8.3	2.6		9.5	57 35.8	19.5		9.2	32.6	42.6	A
8.7	55 0.5	16.4	A	9.1	42 36.8	11.1	A	9.4	37.6	12.5	A	9.5	36.3	17.5		9.0	42 16.4	52.5	A
8.8	2.8	51.9	A	8.9	43 18.5	54.3	A	9.4	49.6	34.2		8.4	58 21.3	29.1	A	9.2	34.3	10.0	A
9.3	25.0	54.3	A	9.5	45.8	15.1		8.1	55.5	18.0	A	9.5	0 50.9	0.6		9.5	43.6	12.0	
9.2	57 9.5	55.3	A	9.5	52.2	23.0		9.5	56.0	20.8		9.3	2 22.7	21.1		9.5	43 48.0	20.2	
8.4	35.0	3.4		9.1	44 41.0	1.2		9.5	25 13.8	30.5		9.1	39.5	33.9	A	7.5	44 41.4	3.3	A
9.5	56.5	25.3		7.5	57.8	0.2	A	8.8	15.9	14.0	A	9.0	3 32.8	58.3	A	9.1	45 52.5	9.8	A
9.1	58 1.1	21.3		8.8	45 11.5	42.0	A	8.5	49.6	36.4	A	9.5	4 7.4	34.0		9.5	46 38.2	8.3	
9.5	14.0	33.8		9.1	19.3	0.2	A	9.3	26 49.9	17.5	A	9.4	12.1	28.0		9.0	47 7.9	6.3	A
9.5	59 8.7	2.9		9.3	31.4	53.3		9.4	52.8	24.6		8.4	35.8	18.0	A	9.5	39.5	15.4	
9.5	15.5	13.9		9.3	46 22.0	55.3		9.0	27 44.9	29.8	A	8.4	5 14.4	56.5	B	9.5	46.0	31.1	B
9.5	0 39.8	58.8		9.4	47 30.6	24.5	B	9.5	28 14.2	39.9		9.3	6 15.4	17.0		9.5	55.4	43.0	
7.2	1 5.2	13.3	A	9.5	48 27.0	33.3		9.5	29 4.0	40.7	B	9.1	7 41.6	59.2	A	8.5	48 37.9	14.2	A
9.5	34.5	24.8		9.2	50 29.8	9.1	A	9.1	7.9	23.6	A	9.5	8 10.8	2.1		9.4	49 56.0	7.3	A
9.4	46.6	6.4	A	9.4	51 37.4	21.5		9.5	40.3	4.0		8.9	32.9	36.1	A	9.5	50 42.3	40.0	
8.8	2 18.5	7.8	A	9.4	41.3	16.1		9.4	41.4	54.3		9.5	9 44.5	41.0		9.0	52.7	20.7	A
6.8	28.5	11.4	A	9.3	52 26.8	30.5		7.8	30 1.6	36.5	A	9.5	46.4	19.5		9.0	51 22.0	35.0	A
9.5	59.7	32.7		9.3	30.1	21.0	A	8.4	13.8	25.9	A	9.5	10 45.1	41.5		9.3	55.4	53.9	
9.5	3 3.0	50.4		9.1	46.8	16.2	A	9.3	31 6.3	13.0		9.5	45.5	1.6		9.4	57.4	3.1	B
9.2	59.9	44.0	A	9.1	53 13.9	23.5	A	9.4	32.9	1.1	A	9.3	11 20.8	22.5		9.4	52 4.6	37.3	A
8.9	5 11.3	29.1	A	9.5	54.0	33.4		9.5	32 31.0	38.2		9.4	12 16.3	19.0		9.3	6.3	3.2	B
9.5	6 59.8	36.0		9.3	54 49.6	24.0		9.4	51.1	16.5		9.4	39.5	31.9		9.5	54 15.0	58.4	
9.5	8 22.3	12.1		9.5	55 33.9	9.7		9.5	34 21.5	40.8		9.5	13 16.7	8.7	B	8.7	18.0	24.1	A
7.3	47.8	17.6	A	9.5	56 1.1	50.7		7.8	35 1.4	45.4	A	9.5	27.7	59.3		9.5	55 53.9	10.7	
9.2	12 39.7	11.1		6.8	57 24.9	56.9	A	8.9	36 0.9	51.3	A	9.2	15 2.3	17.6	A	9.5	57 39.0	32.0	
9.2	13 7.4	10.1		9.3	56.8	52.5	A	9.1	54.4	41.9	A	9.2	9.6	59.9	A	9.4	47.4	17.7	
9.2	36.5	51.9	A	9.4	58 31.1	20.7		9.1	56.0	45.3	A	8.8	44.9	50.5		9.2	48.2	54.5	
8.5	14 44.0	19.5	A	9.5	2 8.2	44.8		9.2	38 3.7	40.1	B	9.5	16 7.1	37.6		7.8	54.2	51.0	B
9.5	16 25.5	58.8		8.7	19.5	10.9	A	9.5	4.1	41.9		9.5	10.5	53.0		8.5	58 22.7	26.3	B
9.0	28.4	8.1	A	9.4	31.0	51.8		9.5	41.4	47.3		9.0	16.7	23.1		9.1	26.7	22.8	
9.2	44.0	44.4		9.4	59.4	51.8	A	9.5	39 45.0	23.4		9.5	17 9.8	50.5		8.5	59 15.9	14.8	
9.3	17 43.9	36.7		9.5	3 35.6	2.5		9.5	45.3	1.1		9.3	15.0	56.7	B	8.8	1 18.4	16.7	A
9.3	18 44.0	52.4		9.3	4 18.8	47.8	A	9.2	51.8	36.4		8.4	18 34.8	41.9	A	9.4	2 14.2	38.3	
9.4	19 23.5	24.7		8.8	55.0	14.5	A	7.0	40 10.3	38.1	A	9.4	45.9	14.6	A	8.1	41.9	13.8	A
9.5	20 38.9	1.2		7.2	5 33.8	39.7	A	9.5	41 45.3	35.9		9.2	19 21.1	17.6	A	9.5	55.8	59.4	
8.4	21 58.5	24.4	A	9.4	58.5	21.5		8.7	42 12.4	2.1	A	9.2	20 11.1	39.6	A	9.0	3 40.7	28.4	A
9.2	59.2	32.4		9.4	7 49.1	21.5		8.9	24.1	11.5	A	7.3	21 42.0	26.7	A	9.4	4 17.9	17.7	A
9.2	23 49.8	4.7	A	9.5	8 12.4	42.4		9.5	43.0	2.5		9.1	45.8	42.0		9.5	47.9	52.5	
9.5	24 28.9	49.4		6.0	30.5	16.0	A	9.5	48.3	22.5		9.5	24 32.8	30.1		9.3	5 23.8	41.6	
9.5	41.3	26.1		9.5	41.8	33.0		9.4	43 25.3	30.2		9.5	40.7	22.6	B	9.3	8 1.8	40.5	
9.2	25 15.0	54.0	A	8.7	45.3	44.8		9.5	35.5	44.4		7.7	26 24.8	5.9	A	9.4	10.3	21.7	
9.2	26 4.0	51.0	A	9.0	9 22.6	21.4	A	9.4	44 1.5	50.9	B	9.0	28 24.5	55.9	A	8.2	10 42.8	27.1	A
9.5	15.4	14.6		8.1	10 54.9	45.4	A	7.2	38.1	44.8	A	8.8	29 18.3	10.1		9.5	46.9	54.4	
9.5	54.3	22.1		9.4	11 24.7	44.9	A	9.1	45 16.4	12.5	A	9.4	37.4	56.6	B	7.7	11 22.7	32.4	A
9.2	28 23.2	39.3		9.5	28.5	42.4	B	9.3	31.8	49.3		9.5	30 19.8	19.6		9.2	36.9	0.9	A
9.3	29 24.5	23.7		8.6	28.6	16.5	A	9.0	46 22.8	1.6	A	9.0	24.0	52.9	A	5.0	12 5.2	26.6	A
9.3	48.3	53.3		9.5	12 48.4	52.8		9.0	49 19.3	17.5		9.4	56.5	54.4		9.5	13 32.8	45.7	
9.3	31 7.6	21.5	B	9.2	13 45.1	27.5	A	9.0	50 11.9	51.3		9.0	31 10.8	1.2	A	9.5	16 41.9	17.7	
9.5	57.9	37.6		9.3	14 49.2	38.1	A	8.9	28.4	43.3	A	9.5	31.9	25.0		9.4	49.5	1.8	A
8.9	33 23.9	20.2		8.5	16 1.6	11.0	A	9.3	51 32.8	3.6		9.4	32 0.1	24.0	B	9.5	17 27.0	3.8	
9.5	42.5	16.1		9.4	58.1	24.8		9.5	37.5	31.4	B	9.5	39.8	15.6		9.0	18 31.9	45.0	A
6.6	35 11.1	33.5	B	7.8	17 13.7	10.0	A	9.3	52 43.7	0.9		9.5	34 27.5	30.6		9.5	19 22.7	30.2	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	13ᵘ—14ᵘ	+50°			14ᵘ	+50°			14ᵘ—15ᵘ	+50°			15ᵘ	+50°			15ᵘ—16ᵘ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	20 4.0	7.8		9.4	12 6.6	40.8		9.3	44 48.8	42.5		9.1	24 10.4	37.6		9.4	55 16.8	54.0	
9.0	22 14.4	7.2	A	9.0	59.9	15.4		8.9	46 44.8	44.1		8.5	41.3	56.2	A	9.5	45.0	44.5	
9.5	14.6	21.2		9.0	13 10.6	30.2		9.3	47 48.6	43.0		9.2	25 4.3	57.6	A	9.0	56.7	15.3	L
9.3	33.2	4.8	A	9.5	14 35.0	54.5		8.7	51 4.0	41.7		9.1	14.4	45.7	A	8.3	58.2	19.6	L
9.1	23 12.5	12.7	A	8.3	15 25.6	30.5	A	9.4	24.4	27.8		9.4	26 1.8	32.3		9.2	57 15.6	42.1	
8.5	39.9	56.4		9.5	16 23.2	2.9		6.0	34.5	12.5	A	9.5	14.0	15.5		9.2	25.3	23.3	A
9.0	25 0.4	8.7	A	9.4	17 17.1	21.9		8.0	53 35.8	40.7	A	9.3	35.3	56.2		9.3	54.3	40.3	B
8.8	27 11.3	14.7		9.4	33.4	8.9		9.5	54 33.3	47.0		8.7	27 12.6	37.6	A	9.2	59 2.2	19.6	A
9.0	28 19.4	56.5		9.3	47.3	22.9		9.5	45.6	18.2	B	9.5	51.4	30.4		9.5	42.5	13.7	
9.5	29 23.5	49.0		7.3	18 22.9	2.9	A	9.4	58.8	31.7	B	8.9	28 41.4	25.3		8.8	48.4	53.7	A
9.5	40.1	1.3		9.5	23.8	37.6		8.3	55 2.2	24.5	A	8.1	29 8.4	38.9	A	8.7	0 10.7	54.2	A
8.4	44.0	23.9	B	9.1	26.4	11.8		7.5	8.0	0.6	R	9.5	54.2	0.2		9.5	44.6	47.1	
8.9	30 14.4	12.7	A	9.4	35.7	44.1		9.5	28.1	16.5		9.1	30 20.4	27.0	A	9.5	45.6	29.1	
6.5	44.9	13.7	A	8.7	44.6	32.5		8.3	57 21.8	44.5		6.7	54.9	29.3	A	9.4	2 1.1	30.6	
9.4	32 13.9	46.2	B	7.3	54.4	11.8	A	8.8	59 33.5	29.6		7.0	55.2	9.6	A	9.3	2.4	34.1	
9.5	16.5	8.3		9.2	56.0	15.3		9.3	58.2	5.9	B	8.5	31 23.8	51.7	A	9.5	4 34.2	44.8	
9.5	24.4	54.5		8.5	19 7.2	55.0		9.0	0 44.8	52.0		8.2	56.8	33.4	A	7.2	5 12.0	32.6	A
9.5	33 10.5	7.3		9.3	20 12.8	59.0		8.5	45.6	13.6	A	9.4	32 8.9	32.0		8.5	15.1	9.6	
9.1	35 0.9	41.7		9.5	25.2	36.5		9.5	55.2	6.1		9.3	9.8	18.0	A	9.2	7 27.0	18.0	A
8.7	36 27.4	18.7	B	8.8	21 7.2	52.1		8.8	1 6.9	2.2		8.5	39.8	59.6	A	8.6	44.1	20.8	A
7.5	37 12.3	46.0	A	9.1	57.3	27.2		9.5	10.4	55.0		9.4	33 2.3	50.6		9.5	8 1.2	51.7	
7.7	26.4	18.2	A	9.5	22 30.0	13.4		9.5	2 7.9	33.8		9.1	8.4	21.5		9.0	49.9	47.8	
9.5	38 51.0	42.6		7.0	34.4	2.5	A	9.4	26.3	45.5		9.5	29.7	23.0		8.8	10 9.8	3.4	
9.5	40 8.8	26.7		5.8	23 37.6	30.2	F	9.4	28.7	13.6		7.3	40.8	33.9	A	8.5	12.5	26.8	
9.5	20.5	3.9	B	9.0	24 25.3	51.9		9.3	3 5.9	41.7		9.1	57.2	49.2		8.9	15.5	11.3	
9.4	41 21.3	6.2		9.5	33.8	55.5		6.8	44.7	36.6	A	6.0	34 21.0	53.4	A	9.5	48.2	55.2	
2.0	49.8	3.1	A	9.5	25 37.7	51.0		9.4	55.2	35.1		9.2	35 19.7	14.6	A	9.5	12 17.9	19.3	
7.5	42 15.9	57.2	A	9.5	26 32.8	54.0		9.4	4 25.9	16.6		8.5	36 10.3	18.2	A	9.1	13 20.0	22.4	
8.1	43 32.5	8.4	A	8.0	45.0	13.8	A	9.2	5 21.3	49.2	B	9.4	56.9	3.6		9.0	21.7	58.2	
8.5	46 17.0	39.8	A	8.9	50.3	56.5	A	9.0	6 7.2	38.0		8.5	37 1.1	40.0	A	9.5	14 9.4	51.7	
8.7	51.8	43.4		9.4	27 45.6	33.1		9.1	22.1	24.0		9.0	39 23.2	57.2	A	9.5	13.3	31.0	
9.2	47 33.5	18.3		9.2	51.3	23.9	A	9.4	23.0	50.2		9.2	40 12.9	36.5		9.5	25.5	32.7	
9.5	49 16.4	11.8		9.4	29 11.5	50.5	B	7.4	7 0.5	27.0	B	9.5	41 23.5	2.7		9.5	15 28.2	44.8	
8.5	47.5	45.6		8.5	16.8	39.4	A	7.2	8 26.8	19.5	G	9.5	42 0.1	46.8		9.5	44.8	31.0	
8.6	52 4.9	24.2		5.7	35.5	0.6	A	9.5	9 18.9	56.6		8.0	0.3	13.4	B	9.0	16 4.0	35.1	
9.5	58.3	30.7		8.8	30 11.5	25.1	A	7.5	30.5	48.1	B	8.8	43 11.5	45.3	A	8.6	44.4	8.8	
9.5	53 33.1	4.6		9.5	31 9.7	41.2		8.4	57.8	25.6	A	8.0	20.7	20.1	A	9.3	50.9	11.8	
9.2	54 46.6	38.4		7.8	27.0	9.5	A	8.5	10 44.9	16.1	A	7.6	55.6	27.4	A	9.5	54.6	47.3	
8.0	55 23.4	10.9	A	9.3	55.4	58.6		9.3	52.2	41.4		8.3	44 26.1	15.9	A	9.5	17 26.7	2.4	
9.2	26.5	17.8		9.4	32 0.6	56.6		9.3	12 0.1	53.2		9.5	30.9	2.3		9.0	44.8	44.4	
8.4	48.7	50.5	A	9.2	20.9	37.4	B	9.3	35.7	4.1		9.5	51.5	38.8		9.5	18 20.9	19.8	
9.2	56 13.3	28.5		9.3	33.4	38.9		9.2	39.6	43.7		9.3	45 20.0	41.9		7.5	19 14.5	40.9	B
9.2	58 58.4	3.0	A	9.3	59.8	42.1		9.3	13 38.3	49.2		9.2	48.2	48.4	B	9.3	21.5	36.9	
7.8	0 45.3	20.9	A	9.5	34 52.9	52.7		9.1	14 26.7	32.0		9.3	46 41.5	7.2		9.5	20 2.7	52.7	
9.5	1 38.8	39.1		9.0	37 22.6	43.5	A	7.0	55.8	44.2	A	8.8	47 20.1	14.6		8.0	5.2	32.2	B
9.5	2 42.6	35.8		9.2	38 22.0	14.9		9.2	15 3.9	40.0		9.1	52.5	33.0		9.4	32.6	11.8	
5.5	51.5	9.4	F	9.0	30.5	5.9	B	9.4	16 26.5	59.8		9.0	48 26.9	7.7		7.6	21 9.9	47.0	B
8.6	3 29.4	2.5		9.3	39 17.3	59.8		9.4	31.6	30.8		8.6	47.5	51.8	A	8.0	53.0	38.0	
9.0	51.0	7.4		9.5	33.1	29.1	B	8.7	31.8	57.6	A	9.0	50 20.3	22.1	A	9.3	22 1.6	1.2	B
9.5	51.2	28.7		8.4	44.0	17.5		8.8	17 28.4	37.2	A	9.4	23.5	34.0		9.4	44.3	56.2	
9.0	4 9.0	18.9		9.5	51.1	32.1		8.5	18 36.4	9.1		9.0	35.7	26.3		9.5	23 0.9	29.7	
9.5	43.3	37.6		9.5	40 40.8	59.5		8.3	39.6	42.7	A	9.5	49.0	55.8		9.5	13.2	41.8	
8.5	5 13.4	7.9	A	9.0	54.4	50.0	A	9.1	19 15.8	46.7	A	8.3	52.0	16.7	A	8.5	19.0	17.2	
8.5	44.2	56.0	A	9.3	41 4.1	54.8	B	8.2	25.3	2.2	A	9.5	51 46.9	4.7		9.5	24 16.9	47.3	
8.9	6 22.0	27.2		9.1	22.3	54.0	B	8.9	21 23.4	19.1		9.5	52 10.0	59.2		9.3	58.1	58.6	B
9.5	10 0.3	14.4		9.2	43.5	5.0		9.4	22 51.4	29.3		9.4	53 50.7	29.0		9.5	25 13.2	53.7	
9.3	15.2	15.8		9.4	42 42.7	10.0		8.8	53.7	15.6		9.4	55.2	58.7	A	9.5	20.5	17.8	
7.5	53.8	51.0		8.0	53.6	10.1	B	7.3	23 18.8	49.7	A	9.0	54 35.3	40.5		9.5	19.8	19.8	
9.5	11 20.0	23.8		9.0	43 44.7	22.3	R	8.5	43.4	16.0		6.0	59.2	19.1	G	9.5	52.6	10.2	
9.5	26.0	29.0		8.2	44 27.5	27.1	A	8.6	57.2	9.6		9.1	55 1.7	11.7		9.5	27 24.9	19.4	

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	16ᵐ	+50°			16ᵐ—17ᵐ	+50°			17ᵐ	+50°			17ᵐ—18ᵐ	+50°			18ᵐ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	27 42.5	11.4		9.3	59 38.7	24.4		9.5	28 36.0	59.1		9.5	50 24.8	41.0		9.5	9 35.1	5.6	
9.5	28 17.5	3.8		9.4	0 12.0	58.1		8.9	39.3	29.7	B	9.5	33.4	22.2		8.7	58.8	58.3	A
9.5	19.6	4.5	B	9.1	2 28.7	33.0		9.5	41.6	31.7		9.0	51 0.3	23.2	A	8.7	10 0.9	29.6	A
8.8	42.1	29.7	A	8.3	31.9	28.4		9.4	54.8	40.7		9.2	15.3	57.7		9.2	3.7	32.5	
6.8	29 8.4	26.4	A	9.3	3 30.4	23.1		9.1	29 6.5	58.1	A	9.3	41.5	53.0		9.2	6.9	57.9	
9.5	30 48.3	5.8		9.5	4 10.6	13.5		9.1	14.3	55.8	A	9.5	51.4	2.1		9.1	11 4.4	25.0	
9.5	50.5	16.3		9.3	56.1	33.9		9.4	40.4	37.6	B	9.2	52 22.9	59.0		8.0	10.1	12.1	A
9.2	59.0	44.2	A	9.0	5 9.7	51.7		9.5	47.3	11.2		8.6	32.3	30.0	A	9.1	32.2	4.8	
9.5	31 20.9	4.4		9.5	41.5	19.5		9.4	30 8.6	55.3	A	9.5	37.4	48.0		7.5	53.9	55.9	L
9.2	41.3	17.0	B	9.4	6 40.7	4.7	B	9.5	54.4	27.6		9.5	50.8	12.2		9.4	12 6.8	51.8	
9.5	47.1	14.3		9.5	7 9.6	27.5		9.3	58.7	2.7		8.8	51.4	47.5	A	6.8	32.2	29.3	A
9.5	56.7	20.7		9.4	9 37.0	50.7		9.1	31 10.4	40.1		9.5	53 13.2	29.6		8.3	49.3	10.1	A
9.5	34 46.1	11.8		9.4	47.5	3.5		9.4	37.1	2.7		9.5	23.4	53.0		7.6	57.7	33.8	B
9.1	35 4.3	14.3	B	9.4	50.1	7.5		9.3	33 16.9	57.7		9.4	35.3	45.3		8.7	58.3	49.0	B
9.4	36 18.4	59.9	B	9.3	52.2	19.4		8.6	21.4	13.2		9.5	54 20.0	51.3		9.5	58.5	52.5	
9.3	44.1	18.3		8.6	11 3.3	11.5		9.5	46.3	18.7		9.4	29.9	0.4		9.5	13 29.4	39.5	
9.3	37 14.1	34.9	B	9.3	5.1	31.0	R	9.2	48.3	6.0		8.3	30.3	20.0		8.8	45.0	59.9	
9.5	52.5	57.0		9.4	31.0	50.7		8.1	54.4	45.3	B	9.5	55 18.8	31.5		9.5	55.5	3.5	
6.5	38 38.7	13.6	A	9.4	46.0	37.0		9.5	58.2	44.9		9.3	56 8.7	38.1		9.5	14 32.4	45.9	
9.3	39 32.5	35.5		9.3	12 39.9	54.2	B	8.5	59.8	32.6		9.4	11.4	3.9		9.5	41.0	2.2	
9.5	36.4	47.0		9.5	50.2	28.9		9.5	35 40.0	11.2		8.8	21.5	39.4	B	9.1	45.5	47.4	
8.2	58.9	56.4	A	7.8	13 5.3	46.2	A	9.5	36 18.0	13.1		8.0	36.6	55.7	B	9.3	16 7.4	32.0	
9.3	40 17.5	52.0		9.5	36.0	29.3		9.5	19.9	20.2		9.5	53.4	45.5		9.3	8.2	21.5	
9.0	19.5	52.5	B	9.5	46.0	7.0		9.5	48.8	51.4		9.2	54.2	34.4	A	9.3	22.9	57.5	B
9.4	31.9	29.6		8.9	14 27.0	43.7	A	9.4	37 14.9	12.2		9.5	58 13.9	35.5		9.4	17 4.5	56.5	
7.3	47.6	9.8	J	8.8	35.3	1.6		9.4	25.8	4.0	A	9.5	29.6	4.3		9.5	11.5	54.4	
9.5	41 38.8	17.8		9.1	16 6.3	20.4		9.5	41.4	56.3		9.3	44.4	27.5		9.5	23.0	4.7	
9.5	41.3	43.0		9.0	31.9	46.2	A	9.5	58.2	47.5		9.5	59 5.2	6.6		9.5	27.4	44.9	
9.3	42 18.3	27.6		9.5	17 15.0	24.4		6.8	38 14.9	33.6	A	9.4	15.0	53.0		8.5	38.0	30.9	A
9.0	24.9	35.5	A	8.8	22.7	12.5	A	9.5	38.4	45.6		9.5	24.1	25.6		8.6	18 2.0	18.5	A
9.3	37.3	59.8	B	8.3	41.5	59.4	A	8.8	52.8	59.9	A	9.5	28.0	29.5		8.5	40.3	56.2	A
8.4	44 25.5	34.2		9.2	51.7	3.7	A	9.5	39 0.0	57.7		8.0	34.9	3.9	A	9.2	19 1.7	24.1	A
8.1	28.6	16.8	A	8.8	19 3.5	32.1		9.0	22.8	18.7	A	8.2	38.2	41.9	A	9.4	4.4	30.5	
9.3	37.4	51.5		9.3	4.2	46.1		9.5	49.1	57.8		9.3	0 16.0	58.9		9.5	32.2	46.5	
9.0	56.8	56.5		9.5	21.0	49.2		9.2	40 8.9	8.0	A	9.5	30.6	13.5		8.5	20 6.7	44.0	
9.5	45 48.1	9.8		9.5	48.9	59.5		9.1	57.4	3.3	A	9.5	37.7	51.4		9.5	21.4	34.4	
9.5	58.2	47.5		9.2	59.7	26.9		7.5	41 22.1	6.0	A	9.4	40.9	15.6		8.7	21 19.1	23.3	B
9.3	46 28.4	19.3		9.2	20 30.4	10.3		9.3	23.8	8.8		9.5	50.2	50.6		9.0	30.3	27.5	
9.3	48 36.7	25.9		9.5	36.8	58.0		8.9	38.8	19.0		8.5	55.7	47.4	A	9.5	31.7	16.0	
8.8	49 4.3	6.8	A	6.8	51.4	34.5	L	9.5	42 4.2	33.8		8.6	1 5.1	52.0	S	9.0	52.4	25.4	
9.5	31.2	9.3		9.4	57.0	15.1	B	9.5	9.0	37.4		9.5	57.4	43.1		9.0	58.1	17.0	
9.4	50 20.1	39.7		7.0	21 6.4	49.8	L	7.8	18.3	14.2	A	8.3	2 19.5	20.6		8.9	22 24.4	14.6	A
9.4	20.1	44.3		9.5	22.9	18.5		9.0	56.9	43.1		9.5	21.2	42.0		8.9	24.4	4.2	
9.1	32.3	43.7	B	9.5	41.0	31.8		9.1	44 0.4	41.3		8.8	3 19.7	26.9	B	9.5	25.5	30.5	
6.5	52 24.7	17.0	A	9.3	22 25.3	20.2		9.5	55.4	1.7		6.5	26.9	48.9	A	9.3	56.1	1.2	
9.0	36.7	21.6		9.1	23 19.8	2.4		9.2	45 9.3	14.2	R	9.1	59.9	53.0		9.5	23 3.8	9.8	
8.8	46.9	12.8	A	9.2	35.7	24.2		9.5	28.9	35.9	B	8.2	4 19.6	51.9	A	9.5	4.7	19.1	
9.5	55.0	46.7		9.3	24 4.9	42.4		5.0	37.1	50.5	G	9.1	5 14.0	29.0		9.3	25.2	41.0	
9.4	53 18.1	20.0		8.8	17.9	41.0		9.1	43.0	14.2		9.2	28.8	56.9		9.3	25.3	51.9	
9.2	54 11.5	7.2	B	8.3	54.3	17.2	A	9.5	46 9.6	48.8		9.4	6 0.9	26.0		9.1	24 0.0	20.5	A
9.5	13.9	10.2		9.2	25 22.0	23.5	A	9.5	21.9	26.0		7.0	9.8	21.6	A	9.5	32.9	11.0	
7.5	33.4	54.2	A	6.8	29.2	59.7	S	9.2	44.8	10.6		9.3	25.1	20.8		7.6	34.1	56.6	A
9.4	54.6	24.2	B	7.3	30.1	12.2	A	9.3	52.9	52.0		8.8	7 27.5	35.5	A	9.2	34.5	38.0	A
9.4	55 20.2	28.2		9.1	33.4	10.2		9.5	56.7	23.8		8.5	37.6	45.5	A	9.5	53.3	37.9	
9.4	20.5	54.7		9.0	56.4	23.6	A	9.5	47 58.9	37.6		9.1	8 8.2	48.4		9.5	55.7	43.9	
9.5	56 29.0	30.4		8.4	26 3.5	41.1	A	9.5	48 51.0	50.5		9.5	9.4	24.6		9.4	25 1.9	30.0	
9.5	57 2.1	3.6		9.5	43.4	8.8		8.0	56.6	25.1	L	9.1	28.4	9.9		9.4	49.4	12.3	
7.1	58 37.5	31.0	B	9.5	52.6	11.0		9.4	49 4.8	13.2		9.0	9 3.9	26.5		9.5	58.3	46.1	
9.3	59 30.1	13.3	B	8.4	27 21.4	11.2		8.8	33.6	8.7	A	9.3	5.9	53.4		9.0	58.6	29.9	A
9.4	33.6	16.3		7.5	28 4.2	48.4	A	8.9	39.5	18.2		9.5	22.3	57.9		9.5	26 34.5	33.2	

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	18ᵐ	+50°			18ᵐ—19ᵐ	+50°			19ᵐ	+50°			19ᵐ	+50°			19ᵐ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	26 35.3	42.7		9.5	42 8.1	10.1		9.1	0 46.1	41.5		9.1	16 23.9	39.7		9.3	36 51.6	9.7	
9.5	57.0	4.8	A	9.4	32.3	53.7		9.5	1 4.0	1.9		9.5	24.6	30.1		9.5	37 17.9	13.5	
9.2	27 1.2	1.8		9.1	43.8	20.1		9.3	58.5	30.3		9.4	34.0	26.4		9.2	18.7	59.6	
8.7	4.1	0.1	A	9.2	48.6	20.6		9.4	2 15.6	12.2		7.1	44.5	4.2	S	7.9	19.5	2.5	G
9.4	13.0	49.7		9.3	51.9	50.8		9.5	57.4	7.3		9.5	48.2	51.3		9.5	42.8	42.6	
9.1	44.3	29.2		8.8	43 25.5	26.0		9.4	3 23.0	11.4		9.4	18 8.0	39.5		8.8	52.7	54.0	
8.7	28 5.7	28.5		9.1	49.0	44.1		9.5	23.1	37.0		9.4	26.9	32.1		6.3	57.8	11.6	S
9.4	14.2	52.3		9.2	58.2	15.6		9.3	49.0	34.5		9.4	57.4	11.5		6.2	38 0.2	11.0	B
9.4	18.4	35.8		9.2	45 1.9	29.4		8.6	51.4	26.4	B	8.3	19 20.1	45.6		9.0	6.1	18.9	
9.5	40.6	2.9		9.4	20.3	46.0		9.2	53.0	56.6		9.4	20 55.7	20.5		9.0	13.7	26.5	
9.2	58.1	30.3		9.0	20.5	39.6		8.8	4 2.9	43.4		7.8	22 5.3	33.8	A	9.3	25.0	7.3	
9.5	29 13.3	44.8		9.3	46 6.1	33.7		9.2	30.7	4.7	A	8.8	13.8	36.6	A	9.5	27.0	55.0	
9.5	52.3	10.7		9.2	27.8	18.6		8.6	48.3	1.5	A	8.1	22.6	17.0	A	9.4	28.6	5.8	
9.5	30 27.0	9.4		8.2	50.9	58.4	A	7.4	51.2	8.1	A	8.1	38.2	41.5	A	9.2	52.7	20.1	
8.8	29.0	51.3	R	9.5	52.0	37.8		9.0	6 16.4	46.7	A	9.5	23 2.4	43.0		9.0	53.2	1.1	
9.5	31.4	37.7		8.9	53.5	33.9	A	9.0	20.0	11.5		8.6	27.8	33.3	A	9.5	39 21.0	33.5	
9.5	32.7	32.7		8.5	57.4	43.7	A	9.5	58.7	59.8		8.5	31.5	6.3	R	9.5	24.7	37.6	
7.4	55.4	59.9	A	8.9	47 7.8	25.6		8.3	7 8.9	29.1	A	8.9	48.2	7.9		9.2	29.9	54.9	
9.5	31 10.0	11.7		9.2	26.6	0.3		8.6	17.2	16.0		8.5	24 2.4	26.5	A	9.5	30.9	36.1	
9.1	20.8	39.8		7.9	55.8	53.4	A	9.4	31.3	23.9		9.5	27.8	56.0		9.4	42.0	4.5	
9.1	26.4	39.2		8.8	48 18.9	47.9	A	9.5	45.0	31.7		9.2	25 0.3	22.7		7.9	53.0	43.2	B
9.5	55.2	53.3		9.5	33.6	16.6		9.4	9 4.4	59.2		8.9	26 9.3	42.8		9.1	40 8.5	32.4	B
9.2	56.1	57.0		9.4	57.2	44.8		8.8	38.5	53.3		9.5	12.8	39.4		8.0	12.2	33.6	L
9.0	32 48.9	39.9	R	9.4	49 26.8	15.2		8.3	59.7	39.7		9.5	27 22.9	11.5		8.5	26.4	27.9	
9.4	33 20.6	50.1		9.5	27.7	21.6		9.5	59.9	24.9		9.1	26.1	7.2	B	9.3	30.3	46.9	
9.3	33.2	20.1		5.2	38.4	32.0	A	9.5	10 0.0	33.7		8.9	28 0.2	45.7		8.6	34.7	46.6	
8.4	44.0	10.2		8.0	39.9	29.0	A	9.5	40.3	16.1		9.5	9.9	42.3		9.1	38.2	50.4	B
9.5	44.4	25.8		9.4	50 41.0	24.3	A	9.0	11 8.0	53.7		8.4	13.8	25.5		9.2	52.2	56.1	
9.5	34 18.1	37.4		8.8	46.9	24.1	A	9.2	12.9	54.9		9.5	45.5	44.1		8.3	52.6	10.7	
9.5	19.6	14.4		9.5	51 6.0	33.9		8.8	30.3	15.9		9.5	58.9	7.5		7.9	57.8	26.1	B
9.2	28.0	36.7		8.9	34.3	43.7	A	9.3	12 7.0	5.6		9.4	29 5.7	5.3		9.3	41 2.1	50.8	
9.5	45.3	37.8		9.4	41.8	3.4		8.7	10.9	32.7		8.8	10.0	37.3		9.4	19.9	15.9	
9.3	47.6	7.9		8.6	52 12.4	22.3	A	9.3	19.2	37.1	B	9.4	30 28.5	17.5		8.2	33.1	24.1	
9.5	35 28.7	36.4		9.3	14.2	37.7		9.5	27.8	41.8		9.5	31.8	32.8		9.1	33.4	50.2	
9.4	42.5	12.0		9.5	53 2.8	17.4		9.5	31.1	15.4		6.0	34.1	55.9	A	9.4	59.2	36.4	
8.3	44.8	7.5	A	9.5	24.3	53.0		9.1	40.4	27.6		9.5	31 0.0	52.9		9.4	42 7.7	53.7	
9.4	36 8.9	3.7		9.2	46.8	28.9		9.0	46.8	15.6		9.0	10.8	41.7		9.5	12.8	58.2	
9.3	11.8	18.1		9.5	54 5.0	25.1		9.4	54.2	36.6		9.5	13.6	26.5		9.5	13.3	59.4	
8.4	26.9	57.9		8.8	8.3	51.7		8.5	13 1.6	23.4		8.4	14.3	18.1	A	9.5	17.4	19.2	
9.0	28.0	4.0	A	9.4	22.5	43.6		8.8	6.3	31.7		9.5	18.1	27.2		8.6	28.5	36.5	
9.4	37.0	31.0		9.5	29.2	14.1		8.7	6.7	42.0		9.5	19.3	53.7	B	8.3	45.2	38.5	
9.5	37.5	39.9		9.5	42.6	46.1		9.3	9.1	41.2		9.5	32 8.3	18.9		9.5	59.6	38.2	
9.1	38.7	33.1		9.5	46.7	15.7		9.5	13.8	34.7		9.5	37.2	43.2		8.2	43 9.1	1.6	A
9.3	52.8	32.4		9.4	55 22.5	2.7		9.5	56.9	42.3		9.5	49.0	30.7		9.4	35.0	43.1	
8.7	37 3.9	40.9		6.2	24.0	36.7	L	9.2	14 1.0	1.1		9.5	33 10.6	10.8		9.4	37.0	13.1	
9.5	12.5	21.4		9.5	56 11.9	50.5		8.9	1.8	13.3		9.5	19.7	5.6		9.4	37.2	15.3	
7.7	37.9	34.2	L	9.5	15.3	55.8		9.4	15.5	54.2		9.0	36.0	15.9		9.0	41.7	58.2	
9.5	47.2	33.9		4.8	34.7	20.1	A	9.4	17.3	46.7		9.4	55.8	37.9		8.9	48.5	45.5	
9.3	52.4	40.5		9.5	57 12.5	25.5		9.0	28.8	55.0	B	7.7	34 24.8	54.7	A	8.1	56.4	58.6	A
9.5	38 1.3	5.0		9.1	41.6	37.0		9.4	47.5	0.4		9.4	26.6	47.9		8.5	44 15.0	52.2	A
7.8	16.7	59.2	L	9.2	47.6	43.8		8.0	52.2	36.5	B	9.5	29.0	8.5		8.7	16.0	17.2	
9.0	32.1	10.8		9.2	58 17.2	29.0		8.5	15 14.3	36.7		9.5	41.5	20.8		9.0	16.3	28.1	
7.8	39 41.8	27.4	B	9.5	59 6.7	23.7		9.5	17.5	43.8		8.0	35 15.2	46.1	A	9.2	23.1	15.3	
9.5	43.8	46.5		9.2	6.8	42.4		9.5	25.4	39.2		9.5	28.7	12.0		9.5	45 2.0	47.9	
9.5	40 2.4	27.8		8.9	10.0	27.2	B	9.5	44.6	26.9		9.5	36.1	19.5		9.4	25.6	4.9	
9.4	20.7	45.0		8.9	21.6	2.1	R	9.4	48.7	5.2		8.8	41.5	48.1	A	9.4	46 3.8	55.1	
9.3	47.3	55.1		9.5	48.3	13.5		8.8	16 3.3	26.4		8.9	44.0	31.6		9.3	19.9	43.7	
9.4	54.7	39.0		8.8	54.1	40.0		9.4	5.5	53.6		9.3	36 9.5	24.6		9.3	25.4	55.1	
9.0	41 28.2	51.4		8.9	0 8.2	2.5		9.2	6.8	16.7		9.4	30.7	16.0		9.3	44.8	58.5	
9.5	44.9	32.0		9.5	41.8	53.5		9.3	16.0	48.9		9.5	40.7	48.0		9.5	57.7	33.7	

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	19ᵐ	+50°			19ᵐ—20ᵐ	+50°			20ᵐ	+50°			20ᵐ	+50°			20ᵐ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	47 19.5	45.6		9.3	58 46.2	1.1		8.4	9 10.8	12.2	A	9.5	20 7.0	41.2		8.4	31 36.4	13.0	A
7.2	36.0	16.8	A	9.5	59.4	35.7		8.9	12.7	33.1		9.3	13.5	52.6		9.0	45.8	59.0	A
9.5	36.1	14.5		9.5	59.9	45.4		9.5	18.2	9.5		8.8	31.6	52.6	A	8.4	32 2.6	38.4	
7.3	37.2	24.6	A	9.5	59 3.8	45.8	B	9.0	20.9	47.0		7.9	35.3	8.3	L	9.0	7.8	26.9	
8.0	47.9	8.6	A	7.1	8.6	3.6	A	9.2	25.5	28.6		9.4	37.0	50.6	B	7.7	21.1	22.9	A
9.4	50.0	22.9	B	9.5	16.1	49.6		9.5	27.8	51.2		7.7	38.7	49.7	A	8.9	37.6	13.5	
9.5	48 13.8	57.5		9.5	20.0	42.6		9.5	28.3	42.9		8.8	46.0	33.0		9.3	43.9	58.8	
9.5	31.5	25.8		9.1	21.7	24.8		7.1	42.0	48.0	A	9.2	52.8	33.5		9.0	50.0	39.4	
8.1	44.6	39.4	B	9.5	27.2	29.7		9.1	10 6.0	35.0	B	9.5	21 12.1	13.4		8.2	33 27.9	57.3	A
9.5	49 12.6	48.6		9.5	37.0	31.7		9.3	8.4	10.2		9.0	24.5	4.9		8.8	34.0	35.4	A
9.3	17.0	27.0		9.5	0 1.5	22.9		9.5	12.3	29.0		9.5	49.8	56.8		9.5	45.2	14.9	
8.1	18.0	41.1	B	9.1	6.8	30.2		9.5	23.2	47.8		9.5	22 5.6	55.1		9.5	54.1	52.8	
8.9	44.8	1.2	B	7.4	16.0	52.7	F	9.2	46.0	23.4		9.5	8.8	32.2		8.8	34 33.7	42.6	A
7.8	50.0	46.5	B	9.5	25.1	37.2		9.5	11 16.1	0.1		8.7	19.0	2.1		9.5	37.3	30.8	
9.4	56.1	30.6	B	9.2	37.9	51.0	B	9.5	17.8	9.2		7.3	24.9	37.8	A	8.5	38.4	34.7	A
8.9	50 7.8	51.0		7.6	1 13.1	2.5	A	9.4	23.3	30.9		8.6	23 0.1	32.1	A	9.4	41.0	11.1	
9.4	29.7	31.5		9.1	23.6	5.8		9.5	26.4	35.3		9.5	1.0	47.0		9.5	41.5	47.1	
9.2	38.6	10.8		9.3	28.7	9.9		8.8	48.0	42.3		9.4	1.6	59.4		9.4	43.1	14.8	
9.4	41.5	13.9		9.5	31.0	25.5		9.3	59.8	11.9		8.6	25.2	29.8	A	8.5	53.4	47.7	A
7.3	58.1	26.6	G	8.1	41.1	36.9	B	8.5	12 4.7	37.8		9.3	37.3	51.6		9.5	35 25.1	4.9	
8.7	51 20.7	35.9		9.4	2 6.7	50.6		9.2	7.8	59.8		9.2	40.6	9.9	A	9.5	37.0	55.1	
9.5	52 4.9	26.7		9.5	7.9	41.6		9.0	9.6	45.0		8.9	45.4	33.4	A	9.5	53.3	54.8	
9.5	7.6	3.3		9.4	9.2	47.4		9.3	20.1	35.4		9.2	24 14.3	52.7		9.5	36 10.2	19.0	
9.5	19.0	19.2		9.5	14.8	42.6		9.0	35.8	27.8		8.5	17.9	10.1	A	9.4	32.1	1.8	
8.9	31.8	24.6	B	9.5	31.8	52.8		9.3	13 7.4	7.8	B	8.6	36.0	42.4		9.4	40.9	49.5	
9.5	35.3	29.7		8.6	3 4.7	55.3		7.3	27.0	42.1	A	8.8	44.7	53.4	B	9.5	52.2	11.8	
9.4	40.6	28.4		9.2	37.7	35.3		9.4	34.0	4.4		9.5	25 26.1	3.8		9.5	37 16.3	49.8	
9.5	44.7	23.1		9.2	49.8	39.6		7.8	14 37.8	26.9	A	9.5	28.1	54.7		9.3	19.8	57.3	
9.5	45.3	49.8		6.8	4 34.8	9.8	A	7.8	15 0.2	26.1	A	9.3	33.9	28.3		9.3	50.4	32.0	
6.2	46.7	31.1	A	8.7	35.0	50.2		8.7	20.5	47.3	A	9.5	39.0	44.3		9.4	38 10.5	2.0	
9.5	48.6	55.7		9.5	48.2	28.4		9.5	22.0	44.7		8.7	45.4	4.0		7.9	22.7	30.3	B
9.5	53 0.0	6.1		9.5	5 23.3	27.5		9.3	25.6	59.5		8.3	26 32.2	21.3		9.3	33.0	12.5	
9.5	10.5	13.5		9.4	26.2	56.5	B	9.5	29.1	37.5		9.4	33.1	15.4		9.3	46.4	49.0	
9.4	30.2	52.0		9.0	31.5	8.4		9.3	29.7	31.8		9.4	35.0	33.5		8.0	47.7	37.3	B
9.3	34.9	59.5		9.4	41.5	16.1	B	9.1	50.9	37.1	B	9.1	27 9.5	7.2		9.5	52.2	3.8	
7.9	45.8	54.8	L	9.0	43.8	59.5	A	8.9	52.8	57.5	A	9.4	36.0	51.0		9.0	54.9	31.6	
9.4	49.8	15.4		8.6	45.9	54.1	A	9.5	52.9	41.6		9.4	45.3	37.9		9.0	59.0	8.2	
9.5	54 6.4	23.0		9.5	53.8	28.4		8.3	54.0	48.4	A	9.5	28 2.4	50.7		9.2	39 8.0	14.5	
9.5	9.0	12.0		9.0	54.1	53.7		8.7	16 3.1	48.4	A	9.4	10.1	45.3		8.4	20.7	40.5	
8.8	13.7	41.8		9.2	56.3	8.6		9.5	7.3	38.5		9.4	16.5	41.8		9.2	25.1	26.9	
8.8	14.0	37.7		8.8	59.0	58.6		9.0	40.0	10.1		9.4	38.0	8.0		8.7	31.5	10.2	A
9.5	40.2	3.1		8.3	6 3.3	55.9	A	8.8	50.0	3.8	A	9.0	57.8	57.2		9.0	57.2	16.6	
9.5	57.8	55.1		9.5	15.9	25.8		9.1	50.7	56.0		9.5	29 4.7	18.5		8.9	59.9	52.7	
9.5	59.8	52.6		9.4	16.3	2.1		8.7	17 19.5	21.7	A	9.0	7.0	10.8		8.4	40 5.9	30.2	
7.2	55 7.8	16.1	A	9.4	19.8	25.9		9.1	47.2	45.5		9.3	12.8	40.4		9.4	6.6	18.8	
9.3	15.0	41.3		9.5	35.8	17.0		9.5	50.9	59.9		9.2	17.1	3.7		9.5	30.8	24.7	
8.0	48.8	10.8	A	9.3	41.5	21.6		6.7	57.4	4.8	A	9.5	23.2	36.4		9.1	39.2	27.7	
8.7	56 0.5	15.7	B	9.2	47.4	42.5		9.3	18 23.7	57.0		9.4	27.0	55.0		9.2	40.1	1.6	
9.3	10.8	17.5		9.2	48.0	52.2		9.0	24.8	10.6		9.0	28.6	15.4		9.0	46.1	40.5	
9.4	13.8	53.7		9.5	7 2.3	2.3		9.5	42.9	8.2		9.5	29.5	29.6		9.0	41 1.8	15.3	
9.0	21.2	23.6		9.3	36.4	28.5		9.5	43.9	11.2		9.1	35.5	51.9		7.0	14.1	8.5	A
8.0	32.3	15.9	A	9.5	42.5	30.6		9.5	53.5	12.3		9.0	45.5	44.6		8.7	23.6	13.9	A
9.4	41.6	4.8		9.4	8 8.8	36.0		8.0	19 14.0	20.0	A	9.5	45.5	58.5	B	9.4	29.5	52.1	
9.2	46.5	35.3	B	9.4	9.8	59.8		8.7	33.8	57.7	A	9.4	30 33.1	27.7		9.4	45.0	6.9	
9.4	47.4	36.3		9.4	12.2	42.1		9.2	37.8	25.4		9.3	35.0	38.7		9.3	47.1	32.3	A
9.5	58.4	36.1		9.3	13.4	9.7		8.7	39.4	26.1	A	9.5	49.8	4.9		9.5	42 25.0	32.1	
9.4	57 42.7	53.7		9.2	37.1	4.9	B	9.0	44.8	41.0		9.4	58.7	45.0		9.0	49.4	14.9	A
7.8	59.6	9.0	A	9.5	45.0	20.2		9.3	45.7	50.6	B	9.4	31 8.6	37.8		9.2	52.6	11.6	
9.3	59.9	34.3		8.8	57.4	43.4	B	8.8	53.8	30.0		9.3	17.1	37.8		9.5	43 5.5	51.9	
9.5	58 40.0	43.0		9.5	9 5.9	22.4		9.0	54.8	23.9	B	8.5	20.6	6.9	A	9.2	6.5	42.7	

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	20h—21h	+50°			21h	+50°			21h	+50°			21h	+50°			21h	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.2	43 10.9	13.3	A	9.3	0 39.4	15.6		9.1	17 11.2	11.1	A	7.7	32 11.7	42.8	B	9.5	43 11.0	16.3	
8.6	24.5	24.6	A	9.4	1 11.7	19.4		9.0	18 15.3	7.8	A	7.1	12.7	24.8	B	8.6	25.6	56.2	A
9.4	26.1	13.0		9.5	26.0	13.0		9.5	16.1	4.6		9.5	38.0	41.2		9.3	26.5	13.7	
9.4	40.6	4.8		7.4	2 1.5	50.4	G	9.5	21.6	29.4		8.1	40.7	51.0	A	9.5	39.7	51.7	
9.5	49.0	22.4		9.4	30.0	17.6		8.6	23.6	2.8	B	9.1	42.1	35.0		9.3	44.3	36.8	
9.5	44 1.1	31.1		9.4	32.8	59.7		9.5	39.5	21.1		9.3	42.6	13.6		9.5	56.0	54.6	
9.5	19.2	9.9		8.0	45.2	54.7	G	9.5	41.1	42.8		9.2	50.5	1.3		9.5	44 7.9	29.3	
9.2	19.6	34.3	A	9.5	3 32.6	11.5		9.2	53.7	26.0		9.4	33 0.9	20.1		9.4	12.0	42.9	
7.3	45 2.7	14.4	A	9.0	36.2	9.8		8.7	19 38.8	45.6		9.4	4.0	29.7		9.5	34.2	20.9	
8.8	6.0	0.6	A	9.5	40.0	41.8		9.5	42.4	57.7		9.3	10.0	31.3		9.3	57.9	50.0	
6.3	9.9	46.6	A	9.5	4 57.3	4.0		8.8	50.9	12.4		8.8	14.0	47.9	A	7.2	45 15.9	19.2	A
9.3	20.1	3.6		9.5	5 3.3	12.6		9.0	20 8.0	44.5		8.5	30.1	28.1	B	9.5	25.8	0.4	
9.0	30.7	51.8	A	8.8	15.7	57.1		7.3	26.6	30.0		9.3	32.0	16.0		9.5	28.1	3.0	
9.1	46 33.8	24.4		9.5	18.6	32.5		9.3	36.4	54.8		9.3	34 2.5	14.8		9.3	40.7	9.6	
7.2	37.9	52.6	A	9.2	43.1	25.0		9.5	36.5	46.4		9.5	2.9	52.5		8.7	41.1	42.9	
9.4	47 13.3	14.7		9.4	6 14.9	9.9		9.1	21 9.0	29.4		9.4	15.7	23.5		9.5	46 18.8	45.0	
9.4	32.7	44.7	A	9.5	15.4	39.5		9.0	14.0	28.4		9.5	22.8	57.1		9.3	24.9	45.7	
9.5	36.5	29.7		9.5	7 1.3	27.2		9.5	27.9	2.8		9.5	37.5	0.8		9.1	27.2	25.8	
9.5	38.9	56.0		9.2	7.7	3.0	B	9.5	59.5	58.6		9.5	43.5	0.8		9.2	31.2	51.1	
8.6	47.7	5.3	B	9.5	25.0	30.3		9.4	23 4.3	5.2		9.5	46.2	22.1		9.0	32.7	13.1	
9.5	48.5	52.2		9.5	33.1	55.7		8.8	26.0	21.7	A	6.6	49.8	49.3	B	9.1	41.8	5.8	
8.6	48 24.6	4.9	A	9.5	45.8	7.9		9.4	40.6	34.3		9.5	54.0	35.9		9.3	44.2	0.9	
8.8	49 21.2	42.3		9.4	8 12.6	49.0		9.5	40.7	51.1		8.2	55.6	54.0	B	9.4	45.3	5.8	
9.5	35.8	57.0		8.7	46.5	14.9		8.5	44.8	11.2	A	9.5	35 18.1	17.9		9.5	51.0	30.1	
9.0	50 0.5	57.5		9.5	9 12.7	12.9		8.3	52.0	28.5	A	8.9	37.9	51.1		8.3	51.9	45.1	B
9.1	3.1	39.9		9.2	19.2	16.8		9.5	55.0	38.9		8.2	40.4	40.0	B	9.2	47 12.8	13.4	
9.2	37.6	57.2		8.8	24.8	44.1	B	9.5	24 2.7	36.7		8.5	46.9	45.7		9.2	28.2	51.6	
9.3	43.4	59.2		9.4	10 1.0	34.3		9.1	38.6	30.5		9.4	36 21.2	0.4		9.5	34.9	47.9	
9.5	53.5	27.6		7.7	21.2	48.7	A	8.7	39.5	36.5	A	9.5	38.0	0.7		9.3	48 2.5	16.0	
9.4	51 21.0	40.2		7.0	24.7	40.8	B	9.3	59.6	14.5		5.1	56.3	31.5	G	9.3	6.0	17.2	
9.2	36.4	37.0		8.9	39.6	8.2		8.8	25 18.9	32.8		7.1	37 10.5	11.9	A	8.8	8.2	43.0	
6.2	39.1	30.9	A	9.1	55.8	29.9		9.5	25.0	58.4		9.5	15.5	33.5		8.5	10.4	48.9	
5.5	50.2	10.4	A	9.5	11 1.7	36.1		9.0	40.2	14.4		9.2	21.0	51.2		9.5	18.5	16.2	
9.4	52 33.1	48.5		9.0	21.0	7.2	A	9.5	26 0.0	47.1		9.1	24.8	38.7		9.5	25.5	52.1	
9.3	49.8	30.4	A	9.5	28.3	59.0		8.7	9.0	36.8		9.5	40.0	12.8		9.5	31.7	41.5	
8.4	53 28.7	18.6	A	9.5	28.9	49.8		9.3	20.0	20.5		8.0	38 5.0	20.9	A	9.5	38.2	15.0	
9.5	42.6	34.7		9.0	44.0	40.2		9.5	25.0	26.0		9.5	13.5	51.9		8.6	46.5	57.1	
9.5	45.2	15.4		9.5	51.1	42.8		9.4	29.5	54.3		9.4	20.2	15.5	A	9.4	55.6	8.0	
9.4	51.8	43.7		9.4	53.8	23.3		9.0	33.6	59.8		9.1	24.4	57.2		9.1	49 0.1	29.8	
9.5	54 16.0	6.9	B	9.5	12 2.1	20.8		8.7	27 42.0	35.9		9.5	37.7	23.6		9.5	16.3	41.4	
9.5	18.0	4.2		9.4	31.5	7.1		9.5	53.8	21.4		8.7	40.1	15.4	A	9.5	21.4	59.9	
9.4	55 50.6	30.5		9.5	34.1	58.7		9.4	28 35.4	57.8		9.2	59.8	32.3	B	9.5	33.5	31.0	
9.4	59.0	5.4		7.8	13 4.0	35.7	A	8.8	52.0	6.1		8.9	39 15.4	24.6	A	9.5	34.9	2.8	
8.7	56 26.2	47.7	A	9.4	12.2	51.6		9.1	57.3	21.5		9.4	40 7.1	10.2		9.4	41.0	40.8	
9.1	28.0	49.1	A	9.5	23.0	43.1		9.3	29 12.6	17.2		9.3	19.2	0.2		9.5	50 1.4	10.4	
9.0	32.9	18.4		9.1	23.0	41.1	A	9.3	16.9	1.8		9.5	31.2	28.2		8.7	2.9	19.0	
9.1	36.2	25.6		9.4	44.7	18.5		9.4	22.4	9.1		9.5	33.4	41.4		9.5	10.6	59.6	
9.5	40.8	27.7		9.1	14 1.5	25.4	A	9.3	41.6	51.5		9.4	34.0	34.3		9.4	13.9	45.2	
9.3	57 34.0	54.6		9.2	5.2	2.7	A	9.0	51.5	44.2		9.0	47.2	14.4		9.3	26.5	11.1	
9.4	40.0	17.8	B	9.5	13.0	22.3		9.5	54.3	52.0		7.4	48.7	0.4	B	9.4	31.5	21.6	
9.0	48.9	50.4	A	9.5	35.1	12.4		9.4	30 13.2	43.4		9.5	41 16.3	23.6		8.7	40.1	25.0	A
9.5	56.9	56.7		9.4	15 5.6	59.1		9.5	19.1	44.6		9.3	44.5	26.5		8.7	50.2	21.9	A
9.5	57.2	0.9		9.5	15.4	5.7		9.3	35.9	39.5		9.3	45.2	48.5	A	9.5	58.3	15.1	
9.5	58 12.4	6.0		9.5	38.0	35.5		9.1	36.8	54.7		9.3	51.9	42.2	A	9.1	59.9	9.8	
9.5	31.0	51.6		9.3	47.3	8.6		8.8	44.7	8.0	A	9.5	52.8	45.1		9.5	51 7.5	0.0	
7.7	40.1	13.8	A	9.3	16 34.4	22.7	A	9.5	31 3.6	31.1		9.5	42 11.9	30.3		8.0	25.3	52.9	B
9.4	43.7	14.9		8.2	45.5	13.0	A	7.3	7.8	2.3	A	9.5	29.5	6.0		8.5	28.8	44.8	
9.5	59 22.5	49.7		9.2	54.0	11.9	A	9.5	55.0	32.5		7.6	46.5	57.0	A	9.5	30.7	27.1	
8.1	52.2	12.6	A	8.9	54.3	12.6	A	9.5	56.1	43.8		9.5	43 5.4	53.4		9.0	34.1	50.3	
8.8	0 34.0	34.2		9.5	17 8.8	3.0		9.0	32 8.9	11.1		9.4	11.0	4.5		9.2	35.0	47.4	

3501—3560				3561—3620				3621—3680				3681—3740				3741—3800			
	21h—22h	+50°			22h	+50°			22h	+50°			22h	+50°			22h	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	51 41.4	37.3		9.4	1 12.5	23.4		9.5	8 24.5	59.5		9.2	15 53.5	35.1		7.6	25 21.3	7.5	A
8.7	52 13.5	9.0	A	9.5	14.5	23.6		9.3	28.4	3.1		9.4	54.5	14.9		8.2	30.8	22.7	A
8.6	26.5	9.0	A	9.5	15.0	53.3		9.1	32.2	7.3	B	9.2	56.7	8.6		8.0	45.7	29.9	A
8.2	28.9	20.8	B	9.4	15.5	23.4		8.0	33.7	43.1	A	9.4	16 14.1	13.2		9.1	26 0.0	0.2	
8.7	33.6	38.3		9.5	28.6	53.6		9.0	9 8.4	4.0	A	8.8	43.5	45.5		9.1	21.6	14.6	
8.9	38.4	11.7		9.2	33.4	5.7		9.2	15.0	26.6		8.7	45.2	29.8	A	9.5	30.5	43.2	
8.4	45.1	55.8	B	9.5	43.3	57.9		7.5	26.2	46.0	A	9.4	56.9	39.8		9.5	37.6	51.6	
9.5	57.2	5.9		9.0	52.5	15.9		9.5	41.3	32.9	B	9.5	17 2.4	19.5		9.0	27 4.7	28.1	
9.5	59.3	18.1		8.5	54.9	59.8	A	8.5	41.6	41.8	A	9.2	12.1	57.6		9.3	11.6	26.8	B
9.5	53 38.7	28.6		9.3	58.1	48.8		9.5	44.4	7.6		9.0	23.5	17.0		9.5	22.0	41.3	
9.5	42.9	48.4		9.0	2 0.7	15.5		8.7	45.5	20.6		8.2	28.6	49.4	A	9.5	38.5	45.3	
9.1	44.3	44.4		9.5	17.2	15.0		9.4	54.4	2.6		9.5	40.8	20.4		9.1	39.3	38.9	
8.7	51.6	8.5	A	9.0	21.1	43.1	A	9.5	10 6.2	28.2		9.5	42.3	23.1		9.5	40.3	23.3	
9.4	54 1.9	42.8		9.5	27.0	1.5		9.5	18.8	46.6		7.7	49.0	53.2	A	9.4	28 2.0	8.3	
9.5	13.2	13.7		8.5	30.3	54.8	A	9.5	28.1	34.4		7.2	51.6	28.1	A	8.6	56.9	14.7	
9.4	22.5	5.0		9.2	30.5	47.7	B	9.5	29.9	56.7		9.1	53.4	21.6	B	9.4	29 1.9	10.0	
9.4	26.9	34.5		9.5	45.0	44.2		8.3	40.8	22.2		9.1	58.5	37.0		9.5	3.5	56.8	
7.6	44.1	49.4	B	9.0	3 4.9	50.0	A	7.8	42.9	17.1	B	9.5	18 4.6	20.0		9.2	3.8	43.4	
8.5	57.1	54.6	A	9.5	20.4	14.5		9.5	50.6	31.6		9.3	5.4	0.7		9.1	38.0	1.0	
9.5	58.1	16.3		9.0	26.2	1.3	A	9.3	11 0.0	7.7		9.4	6.6	12.0		9.5	41.7	53.4	
9.5	55 8.8	23.9		9.0	29.9	20.2		9.1	10.1	55.8		9.4	14.9	39.3		9.3	30 17.5	14.6	
8.3	25.3	32.3	A	8.6	31.9	4.0	A	9.5	20.3	50.2		9.1	20.0	25.7		9.5	18.1	21.6	
8.7	36.1	35.5	A	9.1	37.3	54.7		9.5	22.3	43.8		9.5	25.8	14.5		9.3	24.6	43.8	
8.5	56 13.5	38.0	A	9.3	51.9	13.1		9.3	25.0	7.1		9.5	47.4	2.0		9.2	43.0	39.3	
9.3	14.1	23.8	B	9.5	52.1	50.6		9.5	25.5	10.5		9.5	55.4	5.7		9.5	44.4	0.9	
9.4	16.2	25.4		9.4	4 2.2	13.5		9.0	28.9	11.1	B	7.0	19 16.3	30.8	A	9.1	55.9	10.4	B
8.8	20.5	38.7	A	9.2	10.7	43.6		9.4	32.5	7.1		9.1	18.8	44.7		8.0	58.0	21.9	A
9.0	22.4	0.1		9.2	12.0	25.7	A	8.2	38.4	5.0	A	9.2	21.3	34.7		8.5	31 16.6	32.1	A
9.4	39.4	6.3		9.4	17.7	14.1		9.0	39.1	14.7		9.4	34.9	0.6	B	8.5	16.8	15.9	A
9.5	50.6	31.4		9.5	18.0	13.2		9.5	51.6	52.3		9.5	50.0	51.0		5.5	27.0	48.2	G
8.9	57 2.5	16.1		9.4	23.1	14.1		7.8	59.5	35.8	A	9.2	20 5.1	37.4	A	9.5	55.8	59.3	
9.2	6.1	52.0		9.1	30.4	12.6	B	9.5	12 1.0	50.5		8.6	9.0	0.1	A	8.8	32 28.0	19.6	A
8.8	20.9	5.8		9.5	30.8	5.4		8.8	8.0	14.2	A	8.7	21.4	6.0		9.2	42.1	57.6	
8.6	26.5	12.2	A	8.5	39.8	17.1	A	9.5	13.5	53.1		8.7	23.8	26.2		9.4	33 7.4	3.9	
9.5	34.6	49.0		8.7	43.2	8.9		9.5	20.9	9.8		8.7	26.2	33.8	A	8.8	8.9	2.7	A
9.5	54.5	37.3		8.4	57.4	5.6	A	8.8	25.7	47.9		9.5	36.7	41.9		9.5	12.6	4	
9.1	58 1.4	59.7		9.5	5 3.1	11.1		9.5	39.6	14.1	B	9.5	21 0.2	58.1		9.5	18.2	33.1	
9.5	20.0	0.4		9.5	7.6	33.8		9.0	13 4.6	38.4		9.4	3.9	47.2		9.4	23.4	10.8	
9.4	22.0	48.1		8.9	12.1	57.8	A	8.2	6.9	4.1	A	8.9	15.5	19.6		9.4	25.5	42.3	
9.5	25.8	21.1		9.2	27.3	43.2		8.5	13.5	29.2		9.4	15.7	0.7		7.5	31.0	24.0	
9.4	49.5	6.3		9.2	30.5	13.8		9.3	22.7	34.0		8.7	36.1	21.2		9.4	37.0	27.5	
9.3	52.1	39.9		6.0	32.9	6.6	A	9.4	32.6	55.6		9.4	44.6	52.7		9.4	38.7	29.5	
9.1	59 1.4	42.0	B	9.4	55.7	28.1		9.4	37.5	38.8		9.4	46.8	51.1		9.5	40.6	34.7	
9.4	2.3	46.2		9.5	6 9.1	51.7		9.5	42.5	44.8		9.3	47.3	6.2		9.4	40.6	31.7	
9.5	6.4	0.4		9.5	17.5	42.8		9.5	44.5	32.8		7.3	55.5	45.4	A	9.5	51.6	48.9	
9.5	15.4	50.3		8.6	24.8	35.6	B	9.0	45.5	46.5		7.0	22 6.2	50.4	A	9.5	54.6	48.9	
9.5	17.1	42.5		9.4	39.5	39.3		9.5	57.5	5.2		9.5	10.8	47.7		9.2	56.3	19.7	
9.5	24.1	11.4		9.5	49.0	43.5		9.5	14 1.6	57.5		9.1	27.3	8.4	B	8.5	34 5.1	50.8	
7.3	40.9	59.9	G	9.5	49.0	35.8		8.4	19.5	31.1		9.4	35.5	10.2		7.8	17.6	47.8	
9.2	53.2	12.3		9.5	7 7.8	45.9		9.5	31.4	21.5		7.7	36.3	34.1	A	9.0	41.1	18.3	
8.5	0 1.6	26.1		9.2	13.5	14.9		9.4	41.2	13.4		9.5	39.0	12.1		9.5	42.2	2.7	
9.0	7.3	30.9		9.1	14.5	20.0		8.9	43.3	16.1	B	9.4	23 6.1	59.9		9.1	48.3	37.8	
9.4	13.9	48.1		9.3	16.7	54.2		6.5	55.7	15.1	B	8.5	7.6	13.3		9.5	35 23.6	22.7	
9.4	17.8	6.0		9.1	19.9	18.2		9.0	58.0	51.0		7.5	13.6	46.1	A	8.3	24.0	10.3	
9.3	21.7	25.9		9.0	21.7	5.5		9.4	15 4.2	39.1		9.5	21.4	23.3		9.5	31.7	41.3	
9.3	40.8	23.2	B	8.0	22.7	28.4	B	8.5	15.0	21.2		9.2	57.1	12.0		9.3	36 16.4	2.8	
9.5	52.0	24.2		9.3	27.4	3.3		9.2	27.8	8.6		8.8	24 8.2	37.6	A	8.8	41.6	17.[illegible]	
9.2	53.5	56.6		9.1	29.6	12.9		9.1	34.4	18.8	B	9.2	29.0	43.6		8.5	46.5	[illegible]	
9.2	2.4	6.4		9.2	32.5	11.2		9.1	34.9	30.7		9.0	45.5	28.1		9.2	59.4	55.7	
9.0	9.7	13.1		9.5	47.0	50.7		8.4	51.4	43.7	A	9.0	25 9.9	46.3		9.3	37 3.0	42.3	

3801—3860				3861—3920				3921—3980				3981—4040				4041—4100			
	22h	+50°			22h	+50°			22h—23h	+50°			23h	+50°			23h	+50°	
m	′ ″	′	″	m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	37 6.1	32.2		8.0	47 18.8	45.3	A	9.3	56 36.0	35.8		9.5	5 30.5	22.3		9.5	19 17.6	54.6	
8.5	14.6	42.9	A	9.5	38.4	29.5		8.7	38.2	59.8	A	9.3	36.4	42.8		9.4	18.5	40.9	
9.2	28.1	28.8		9.5	45.8	7.7	B	9.0	39.1	30.5	A	9.5	57.2	5.6		9.4	28.4	25.7	
9.4	33.3	1.0		9.5	58.6	20.0		9.5	46.0	33.0		9.5	6 33.9	49.4		9.5	43.8	51.0	
9.5	34.6	55.0		9.4	48 3.9	3.6		9.5	54.7	7.8		9.4	34.3	4.7		9.5	57.6	7.8	
9.5	44.5	20.8		9.5	20.8	31.3		9.5	55.0	38.9		9.4	40.6	57.0		9.4	20 25.2	3.7	
8.2	59.0	3.1	A	9.4	28.5	15.3		9.2	57 6.4	55.0		9.4	50.9	4.6		9.5	49.5	57.4	
9.5	38 3.5	21.3	B	8.6	32.4	11.1	A	9.5	36.6	24.7		9.4	54.0	26.6		7.7	21 23.1	34.0	B
7.5	12.6	41.2	A	9.4	34.2	45.5		9.5	37.0	44.1		9.3	55.8	44.1	A	9.3	32.4	35.5	
9.5	14.8	52.6		9.5	34.5	38.5		9.5	50.5	49.4		9.5	7 12.0	11.9		9.1	37.2	53.8	
9.2	15.4	14.8		8.8	39.6	12.9	A	9.0	54.2	44.1	A	9.5	26.1	42.6		8.8	43.8	16.5	
9.5	21.3	22.1		9.0	43.7	45.2	B	9.5	58 1.6	21.0		8.7	55.2	43.2	A	9.4	45.2	1.5	
9.5	39.9	6.0		9.5	48.5	40.2		8.6	23.6	55.5	A	9.5	8 8.7	11.0		8.9	51.7	11.3	
9.1	46.6	26.1		9.4	49 10.9	24.1		9.5	32.6	30.0		9.4	38.9	0.9		9.5	22 29.4	25.3	B
9.4	39 11.0	26.5		8.9	11.2	49.2		9.5	32.8	46.3		9.5	9 4.1	1.9		9.5	35.1	58.7	
9.5	12.7	40.2		9.3	11.9	55.2		9.5	59 2.5	50.3		9.4	10.6	53.4		8.0	40.8	52.9	A
8.0	17.1	43.5	A	9.3	18.5	3.2		9.4	12.2	13.2		9.0	24.0	3.8		9.2	53.4	12.9	
7.8	28.4	33.3	A	9.5	21.7	10.2		9.4	32.3	25.2		9.1	10 8.5	1.8		9.1	23 22.5	15.7	
9.5	41.0	14.0		9.5	36.2	24.5		9.4	37.4	12.5		9.5	13.8	28.7		9.1	27.4	51.2	
9.4	58.6	7.2		9.5	42.1	52.2		9.1	40.9	23.7	B	9.0	14.6	13.3		9.3	40.2	2.8	
9.5	40 1.5	42.0		9.4	50 24.6	41.3		9.4	41.6	57.6		8.0	45.9	2.2	A	9.0	42.3	10.7	A
9.3	33.1	27.0		9.5	28.4	2.0		9.0	43.1	59.5		9.2	54.6	46.3		9.0	44.1	14.4	
9.2	52.4	5.6		9.1	31.8	46.1	B	9.5	46.3	25.3		9.2	11 4.3	3.2	A	9.0	55.6	19.1	A
9.4	57.3	15.3		9.5	48.7	54.1		9.3	54.2	27.7		9.5	20.7	32.7		9.5	24 15.3	20.8	
9.4	58.7	58.8		9.3	56.9	32.5		9.5	0 2.1	51.9		9.4	37.4	45.2		9.1	19.7	4.5	
9.3	58.7	8.2		8.7	51 12.4	53.3	A	7.9	5.7	17.8	L	9.5	53.2	18.7		9.0	44.5	17.6	A
9.5	41 27.4	40.9		9.5	14.6	32.5		8.5	7.4	39.2	A	9.5	12 4.8	34.1		9.5	25 10.9	40.8	
9.2	37.2	24.8	A	9.5	18.9	58.9		9.5	32.6	2.3		9.0	6.7	35.3	B	9.4	12.6	35.5	
9.5	42 12.4	50.8		9.4	19.5	20.0		9.2	46.3	16.8		9.5	8.5	41.5		9.3	21.2	34.3	
9.5	25.3	34.5		9.5	21.7	51.2		9.2	49.5	42.8		9.4	13.9	53.2		9.2	25.7	29.2	
9.4	32.2	53.5		8.6	24.6	41.2		8.9	56.0	50.1	A	9.5	17.0	18.6		9.4	32.7	25.6	
9.4	38.5	27.3		9.5	32.7	51.5		9.3	1 20.6	6.1		9.2	26.3	59.4		8.4	41.6	11.7	A
9.2	42.6	8.9	A	9.5	50.8	47.1		9.3	46.8	59.4		9.5	39.5	30.3		9.3	26 15.9	51.1	
9.3	48.3	4.6		8.0	52 17.0	50.5	A	9.5	48.2	47.1		9.0	13 0.6	53.3	A	8.7	30.2	2.2	A
9.1	43 2.6	56.9		8.5	26.0	14.4	R	8.1	48.6	25.0	A	9.4	1.4	59.9		9.5	45.9	54.8	
7.0	7.7	12.9	A	9.3	32.5	49.4		9.5	2 7.1	51.1		9.5	50.7	34.6		9.2	27 1.7	43.4	
9.4	8.0	43.1	B	8.0	39.4	38.5	A	9.5	17.5	30.1		9.0	53.8	42.4		9.0	4.5	47.0	B
9.4	20.4	28.0		9.0	40.0	31.3	A	9.0	26.0	16.5	A	9.2	14 10.6	52.8		9.3	5.3	28.8	B
9.2	30.6	50.9		9.4	53 11.7	30.2	B	9.5	28.2	36.1	B	9.5	13.5	32.6		8.8	8.4	47.0	B
9.1	37.9	26.1		8.2	14.0	44.4	A	9.5	30.5	32.6		9.5	32.3	5.7		9.1	8.8	7.1	
8.6	53.2	54.7	A	9.5	33.2	32.2		9.0	39.7	10.4	A	9.5	38.6	22.5		8.3	25.4	48.8	B
9.5	53.2	19.0		9.5	54 1.5	4.0		8.8	41.6	45.3	A	9.5	39.7	5.8		9.4	30.3	30.6	
9.4	57.4	34.6		9.5	19.1	32.3		9.5	45.9	22.6		8.0	59.4	29.4	A	9.3	34.1	22.8	
8.9	44 2.0	30.4	A	8.2	22.4	14.2	A	8.5	56.0	56.6	A	9.5	15 24.3	6.6		8.2	44.6	34.4	A
9.3	13.1	37.9		9.5	36.2	57.1		9.5	59.9	0.8		7.4	16 3.9	15.1	A	9.3	28 20.7	40.5	
8.3	29.0	20.9	A	9.5	46.1	1.0		9.0	3 0.7	20.0		9.0	11.2	14.1	A	9.2	31.2	40.6	
7.6	43.6	50.8	A	9.3	48.0	25.5		9.0	1.0	14.4	A	9.4	13.8	47.0		7.0	45.9	27.9	A
9.4	48.5	22.7		9.4	55 4.0	22.1		9.5	37.5	21.7		9.3	14.1	50.9		9.0	52.5	40.4	
9.5	45 17.2	43.4		9.5	8.4	40.5		9.4	56.4	10.0		9.5	26.8	34.5		9.0	56.4	42.9	B
9.4	18.9	5.7		9.5	19.2	17.9		9.4	57.2	45.2		9.1	35.7	5.6	A	9.5	56.7	19.8	
9.2	23.5	31.3		7.5	25.5	4.4	G	9.5	58.5	40.8		9.5	55.5	26.9		9.2	57.8	44.5	
9.5	50.6	43.2		9.4	26.5	19.4	B	9.4	4 6.1	56.5		9.5	17 5.7	4.6		9.3	29 11.6	24.1	A
9.1	51.2	19.9		9.5	31.9	30.5		8.7	16.5	41.8		9.5	13.8	37.8		8.8	31.9	48.3	
9.0	51.9	29.0		9.0	31.9	34.5	A	9.4	19.0	1.0		9.0	18 16.6	12.0	A	8.9	34.2	19.8	A
9.5	58.8	8.1		9.3	35.2	59.4		8.3	40.4	47.2	A	9.5	21.4	28.2		9.4	41.3	32.2	
9.4	46 0.6	55.3	R	9.0	52.6	52.0	A	9.5	55.1	36.4		9.0	26.7	38.6		9.5	30 17.2	13.4	
9.5	31.4	53.8		8.7	54.0	48.2	A	9.5	55.2	8.7		9.5	41.3	16.7		8.8	24.9	9.7	A
9.5	56.2	14.8		9.5	56 5.2	52.1		9.5	5 13.8	58.4		9.5	46.8	27.5		9.1	48.5	7.6	
9.5	47 10.3	34.2		9.5	18.5	32.5		9.2	14.0	24.0		9.5	19 12.7	30.0		8.0	31 2.5	26.6	
9.4	13.3	56.2		9.4	23.5	1.2		9.0	23.5	55.0		9.5	17.0	49.0		9.0	49.7	43.0	

4101—4128				4129—4156				4157—4184				4185—4212				4213—4239			
	23ᵘ	+50°			23ᵘ	+50°			23ᵘ	+50°			23ᵘ	+50°			23ᵘ	+50°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	31 59.4	6.0		9.2	36 13.6	52.9		9.2	41 18.5	37.2		9.5	47 51.3	28.8		9.5	53 14.2	41.6	
9.5	32 6.6	55.4		7.6	19.2	6.3	A	9.2	18.7	26.1		9.4	48 2.0	36.0		9.2	23.8	25.1	
9.2	13.0	21.2		9.3	24.1	32.8		9.4	38.6	22.7		8.4	2.1	55.4	A	9.0	28.5	0.3	
9.4	15.4	26.5		9.5	33.5	48.3		9.5	52.5	44.8		8.7	4.3	4.2		8.8	31.2	52.2	E
9.5	31.2	26.0		9.0	34.0	28.1		8.8	42 5.7	12.5		9.5	18.3	29.6		9.5	34.0	54.6	
9.0	32.0	32.3	A	9.4	51.6	45.0		9.5	43.8	43.1		9.5	18.9	28.9		9.4	39.3	47.0	
9.4	54.6	22.1		9.5	59.8	47.7		9.5	50.2	0.7	B	9.4	37.4	59.0		9.5	42.3	36.2	
9.5	33 2.5	57.4		9.5	37 5.1	43.3		9.4	43 5.0	26.5		9.0	49 17.8	12.2		9.5	56.5	13.0	
9.0	3.2	45.9		9.5	17.0	39.1		6.8	9.2	49.0	G	8.7	18.8	41.1	A	9.2	54 3.1	15.4	
9.5	22.1	23.2		9.5	18.3	48.1		9.5	14.7	30.3		9.5	50.1	41.0		9.5	7.0	35.6	
9.0	22.4	55.8		8.4	41.5	6.5	A	9.5	29.8	13.0		9.3	56.0	57.9		9.5	25.5	4.9	
9.4	31.5	13.0		9.4	38 2.2	51.3		9.5	42.3	40.1		9.4	50 7.7	53.3		9.2	32.4	25.3	
9.3	55.7	31.1		9.5	5.0	31.3		7.9	46.1	35.6	A	9.3	43.4	25.7		9.5	39.8	38.0	
9.1	34 1.8	45.5		8.9	9.2	3.3		8.0	56.4	31.9	A	8.4	44.5	1.8		7.8	55 15.5	40.1	A
8.0	11.7	53.0	A	9.0	59.7	28.2		8.4	44 18.9	43.1	A	8.7	49.2	13.8		9.5	24.0	19.8	
9.4	19.5	22.3		9.3	39 16.8	47.6		9.5	21.2	51.7		9.4	54.0	55.8		9.4	56 12.0	55.7	
9.4	21.6	54.0		9.5	38.5	13.8		9.5	27.0	41.0		9.5	51 3.2	35.5		9.4	51.5	44.6	
9.4	26.4	38.6		9.3	39.4	1.8		9.5	31.5	47.9		var	3.6	34.9	J	9.4	52.5	59.7	
9.0	48.0	53.6		7.4	48.5	25.7	A	9.4	45 17.8	19.4		9.0	13.5	31.0	J	8.5	57 13.4	13.6	
9.5	50.5	33.0		9.5	55.0	42.7		9.2	30.1	21.5		9.4	23.7	3.8		8.2	18.1	43.5	
9.1	35 5.6	57.1	B	9.1	55.7	34.5		9.4	47.0	21.8		9.5	30.2	53.3		8.2	30.5	22.6	J
9.5	26.7	43.1		8.4	56.0	45.2	B	9.1	46 15.6	45.8		9.4	54.3	10.0		9.5	46.5	45.9	
9.3	31.7	4.2		8.8	40 7.8	5.7		9.1	17.2	41.7	A	9.5	52 11.0	15.5		9.4	58 13.7	42.0	
7.3	37.8	37.5	A	9.4	23.6	40.1		7.0	19.3	42.7	A	7.2	11.4	1.6	L	9.3	15.4	2.4	
9.3	40.9	48.7		9.5	26.3	53.6		9.5	38.1	13.5		9.4	36.1	9.6		8.4	44.6	33.8	A
9.5	59.0	59.5		9.5	28.1	38.7		9.5	47.3	15.4		8.9	49.2	28.6		9.5	59 6.5	36.4	
9.5	36 5.6	45.1		9.5	35.2	27.8		9.5	47 4.6	56.1		9.5	53 4.4	44.9		9.0	20.4	57.5	
9.5	11.4	43.5		9.4	41 16.6	32.9		9.4	11.6	51.2		9.5	10.9	53.9					

Zone +51°

1—40				41—80				81—120				121—160				161—200			
	0m	+51°			0m	+51°			0m	+51°			0m	+51°			0m	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.9	0 2.7	51.3		9.5	11 53.1	29.8		9.5	20 30.2	57.2		7.7	32 1.2	5.1	L	9.4	41 48.4	14.0	
7.6	8.3	58.2	L	9.2	56.9	33.4		9.5	31.3	47.1		8.6	34.4	9.2		9.4	56.3	29.3	
9.5	14.0	8.8		9.5	12 13.9	23.8		9.5	40.6	20.9		9.4	37.5	14.7		9.4	42 3.6	35.2	
7.8	58.3	31.7	B	8.9	18.4	5.2	B	9.4	21 45.1	30.9		9.5	44.5	8.9		9.5	4.7	17.1	
9.5	1 7.4	16.5		9.5	19.2	19.7		9.3	46.1	30.1	B	9.5	54.3	8.8		9.5	10.0	1.3	
9.0	56.0	12.1		9.4	47.5	8.0		8.5	55.8	49.0		7.0	33 7.9	24.2	G	9.5	24.5	49.4	
9.4	2 1.8	18.5		9.0	48.2	18.8		8.6	22 18.6	42.8		8.9	12.2	51.7	A	9.5	25.8	55.2	
9.4	11.0	45.9		9.2	13 9.7	36.0		8.7	36.7	1.1		9.5	32.5	1.8		8.7	48.6	30.1	A
8.0	12.8	13.3	R	9.5	21.0	57.6		9.4	23 13.2	33.0		8.5	38.6	21.0		9.5	43 12.7	43.2	
8.8	19.6	14.0	R	9.5	44.9	21.3		9.5	23.8	20.6	B	9.1	42.6	17.8		9.5	44.5	35.3	
9.4	37.5	52.4		9.3	14 5.2	35.3		9.5	33.3	20.8		8.0	59.9	10.5	B	9.5	44 0.9	35.1	
7.1	43.7	26.7	A	9.5	33.7	33.5		9.5	33.3	28.2		9.1	34 5.9	35.0		8.5	24.4	56.9	
8.2	57.2	6.5	L	9.5	35.3	28.4		8.5	24 27.6	17.0		7.0	31.0	33.0	G	7.9	26.8	29.4	A
7.9	3 1.5	30.9	A	8.8	41.3	24.9	B	8.8	25 3.6	3.4	A	8.5	45.6	38.2	L	8.8	32.2	1.9	
9.5	13.4	53.8		9.5	42.0	28.4		8.9	8.3	53.3	A	8.4	51.0	7.1		8.5	51.7	5.3	A
8.8	25.3	38.5	A	9.3	15 0.7	5.7		9.4	27.6	32.7		9.1	54.2	0.8		9.4	59.8	48.6	
9.5	37.0	40.3		9.2	5.3	34.0		9.2	44.8	51.7	A	9.3	35 34.3	10.5		8.8	45 7.8	32.1	A
8.9	51.0	16.1		8.9	16.5	22.3		9.5	47.2	41.0		8.9	45.7	27.0		9.3	14.2	33.8	A
9.4	59.9	59.1		8.6	34.8	54.8	L	9.5	26 39.7	27.9		9.5	36 5.0	49.8		6.3	27.6	54.0	S
9.5	4 17.2	14.3		9.5	47.0	10.5		9.4	53.8	53.2		9.0	37 12.1	18.0		9.4	54.3	21.1	
9.0	5 12.7	34.2	A	9.1	16 2.5	54.4		9.5	27 4.5	0.8		9.4	15.4	42.5		9.5	46 26.2	55.5	
8.4	14.3	7.8	A	6.0	26.6	13.0	A	9.5	11.4	40.4		9.5	38 1.3	49.2		9.5	45.6	52.2	
8.0	39.2	1.6	A	9.5	44.9	50.3		7.8	15.2	2.8	A	9.5	13.4	22.0		9.5	45.7	14.8	
9.4	6 7.4	26.5		9.3	47.9	48.7	B	9.5	28 9.0	16.2		9.5	20.1	28.7		9.5	48.2	33.1	
8.6	8.2	51.2	B	9.0	17 2.4	5.9	A	9.5	17.3	10.8		9.5	34.2	57.3		9.5	58.5	12.3	
8.7	28.0	29.8	A	9.3	14.8	15.8		9.5	28.6	52.3		9.2	44.7	17.8		9.3	47 20.2	6.1	
9.5	53.1	13.1		9.4	20.2	6.6		9.5	40.1	1.0		8.5	57.6	43.3		9.3	35.8	50.0	
9.4	7 12.9	0.5		9.3	32.6	59.1		9.5	52.5	33.7		9.5	39 27.2	1.9		8.4	52.9	42.1	A
9.1	25.2	25.8		9.0	50.6	11.9		9.5	56.9	34.9	B	8.5	49.0	29.0	L	9.5	48 3.5	2.4	
7.6	26.1	50.3	L	9.1	51.2	21.8		9.1	29 26.8	27.2	A	9.5	52.4	53.8		9.5	9.6	23.6	
9.0	53.2	13.6	A	9.5	58.0	49.3		8.6	39.1	11.1	A	8.8	54.1	33.4		9.5	17.1	28.4	
9.5	8 6.6	44.6		9.4	18 23.2	1.3		9.1	49.0	11.3	A	9.5	40 26.2	48.6		9.5	40.2	57.3	
9.5	12.6	46.6		9.4	29.2	42.0		9.3	30 8.4	27.8	A	7.0	28.6	18.5	L	7.3	57.8	27.3	B
9.4	29.0	52.7		8.7	42.4	38.3		9.5	14.1	19.0		9.5	53.1	36.0		9.5	57.8	28.1	
9.5	58.1	54.5		9.5	54.2	46.7		9.2	24.2	6.1		9.5	57.8	27.5		9.3	59.0	45.0	
9.3	9 14.1	38.5	B	9.4	19 24.6	33.4		9.5	39.2	4.5		9.3	41 0.7	19.5		9.5	59.2	18.1	
9.0	18.6	47.1		9.3	37.2	17.8		9.4	42.0	12.0		9.0	20.0	9.1		9.5	49 12.4	38.3	
8.7	10 3.4	8.6	B	9.1	20 4.0	44.4		8.9	47.0	50.3	A	9.5	22.3	49.2		9.5	28.3	36.4	
8.5	30.5	36.8	A	9.2	4.0	17.6		9.5	53.2	35.2		9.3	30.3	35.5		7.2	33.0	21.1	A
7.8	11 13.7	22.2	A	9.3	4.4	5.5		8.7	31 28.9	46.1	A	9.5	34.6	0.8		9.4	46.5	7.0	

201—260				261—320				321—380				381—440				441—500			
	0u—1u	+51°			1u	+51°			1u	+51°			1u	+51°			1u	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	50 26.1	26.1		9.3	6 3.1	3.0		9.2	22 35.9	40.0		9.2	34 10.3	37.8	A	8.6	47 15.9	36.7	A
7.8	33.1	44.1	B	9.5	27.8	45.8		8.2	47.6	52.4	B	9.0	19.7	18.9		9.4	20.4	50.7	
9.4	46.8	46.2		9.0	33.6	37.6	A	7.8	23 1.4	43.3	L	9.5	35.7	40.5		9.5	26.8	9.5	
9.5	52.6	41.5		9.3	34.0	24.6		9.5	8.1	20.8		9.0	56.2	48.1	A	7.7	29.1	46.5	A
9.5	51 8.7	54.6		9.0	42.5	0.5	A	9.4	20.2	7.2		9.3	35 12.0	52.0		9.4	30.5	45.2	
9.5	24.2	7.5		9.5	7 2.6	34.6		9.4	48.0	7.6		9.5	22.8	5.2		9.5	31.7	48.3	B
9.5	40.0	52.9		9.1	9.7	43.2		9.5	24 5.1	56.5		9.5	28.8	22.9	R	9.5	39.6	13.0	
7.8	56.1	21.3	L	9.5	37.1	47.7		9.5	46.8	3.2		9.0	29.3	4.5	A	9.5	46.1	53.7	
9.5	52 15.7	2.5		9.4	8 24.6	4.9		9.5	48.0	51.0		9.5	29.3	9.0		9.5	48 6.8	27.1	
9.5	20.8	41.3		9.2	45.6	42.6		8.9	25 5.3	55.2		9.2	52.2	37.1	A	9.4	16.3	37.4	
9.3	30.6	4.3		8.5	48.4	34.3	A	8.8	13.5	5.2	A	9.4	36 7.1	1.7		9.5	55.7	0.0	
7.5	48.6	16.5	L	9.5	50.9	44.0		9.9	39.2	50.4		9.3	11.4	41.8	A	8.0	49 3.6	10.7	A
9.5	53 25.6	49.5		9.4	59.4	14.5		9.4	44.8	47.5		9.5	34.0	51.6	B	9.1	8.4	55.2	R
9.4	52.8	37.6		8.9	9 19.5	37.4	A	8.8	46.1	24.6		9.5	43.2	53.1		9.4	14.0	12.3	
9.0	54 19.9	9.2		9.5	32.8	0.6		9.1	52.0	35.9		9.5	45.2	53.5		9.2	21.0	57.4	
7.1	26.6	1.1	L	9.5	51.9	21.1		9.3	56.8	38.0		9.5	49.4	19.9		9.4	22.4	33.7	
9.4	27.8	25.7		9.3	10 3.7	11.3		9.0	26 9.5	5.4	A	9.5	37 4.4	8.1		9.5	47.8	51.7	
8.9	59.2	21.0	A	9.2	5.9	10.6	B	7.7	35.7	25.2	A	9.2	7.1	2.1		9.4	50 20.6	54.6	
9.2	55 14.2	25.3	A	9.5	24.4	16.9		7.5	27 38.4	0.4	A	8.3	7.7	17.5	A	9.5	27.5	49.5	
6.0	32.6	43.3	A	9.5	45.0	3.3		9.5	44.8	2.5		9.5	19.4	54.2		9.5	29.5	50.0	
8.6	54.0	41.1	A	9.4	11 8.6	21.6		9.4	28 7.3	33.1		9.5	48.2	11.5		9.5	30.6	45.2	
9.1	56.1	2.0	A	8.0	16.5	54.1	A	9.4	9.4	43.1		9.5	38 14.4	36.3		9.5	42.2	44.2	
9.2	56 8.6	5.9	A	7.0	26.7	22.1	L	9.5	11.4	42.4		9.5	27.9	17.0		9.2	56.4	55.6	
9.5	57.2	37.5		9.5	35.0	22.3		8.9	21.5	53.5		9.5	35.2	14.6		9.0	51 10.6	53.2	
9.5	57 9.5	41.4		6.8	40.1	4.1	A	9.5	29 14.4	0.4		9.5	42.9	54.5		9.3	12.7	47.6	
9.5	49.6	6.0		7.2	12 13.5	13.4	A	9.5	26.7	47.0		8.8	47.1	9.7		9.1	47.5	36.2	B
9.3	55.1	6.8		9.5	23.7	31.0		9.5	29.4	10.5		9.5	39 8.4	34.3		9.5	52 9.7	49.6	
9.5	56.0	31.0		9.5	53.1	10.6		8.5	32.5	41.7	B	9.5	40 36.5	0.2		8.3	30.9	57.2	L
9.2	58 36.1	13.3		9.1	13 9.6	55.9		9.0	36.7	46.9	A	9.5	49.6	35.5		9.2	36.0	8.8	
9.3	54.9	59.8		9.5	16.0	39.4		8.6	36.8	51.8	A	9.3	41 10.7	4.5		9.0	44.2	17.9	R
8.5	59 24.1	52.0	A	7.7	43.1	1.0	A	8.7	58.2	58.1	A	9.0	12.9	14.5	A	9.3	47.2	51.8	
9.5	53.2	45.8		9.5	57.6	23.0		9.5	58.6	42.2		9.4	21.7	48.2	B	9.4	59.4	2.4	
9.4	0 11.0	52.6		7.9	14 24.7	58.7	B	9.5	30 5.0	17.0		9.4	27.2	36.4		9.1	53 0.3	50.0	B
9.5	11.5	1.0		9.5	47.8	53.7		9.2	8.2	33.0	B	9.5	31.0	58.9		9.5	7.8	54.2	
9.3	28.4	11.2		9.4	15 19.2	2.6		9.4	8.5	9.2		8.7	38.1	53.2	A	9.5	19.6	18.0	
8.6	41.6	49.8	A	9.0	36.1	30.7		8.7	10.9	5.0		6.3	43.5	12.6	A	9.5	35.9	55.2	
9.5	45.7	30.8		9.5	38.5	59.7		7.6	25.9	31.9	A	8.9	51.5	29.1		9.5	43.6	53.6	
9.0	1 25.6	6.5		9.1	53.1	14.5		9.5	33.8	26.4		8.6	42 21.5	5.0	A	9.5	52.1	55.2	
7.5	26.4	15.7	A	9.5	16 3.7	5.0		9.5	44.7	19.3		9.4	26.4	24.3		9.2	53.3	50.0	
9.2	50.7	1.4		9.3	37.2	5.1		8.5	46.3	54.5	A	8.5	42.8	38.3		9.5	57.9	8.2	
7.0	57.6	21.4	L	9.5	17 5.0	48.4		9.1	51.2	38.0	A	9.5	47.7	28.1		9.1	54 5.9	0.8	A
9.0	2 13.7	54.0		8.6	8.3	38.0		9.3	58.3	59.8		9.5	55.0	10.2		9.4	33.2	29.3	
9.2	26.3	33.1		9.3	11.6	54.7		8.6	31 13.9	7.6		9.5	43 0.6	11.7		6.7	45.5	15.8	A
9.5	35.5	31.8		9.5	28.4	6.8		8.4	21.6	47.6	B	9.4	20.0	46.8		9.5	55 10.4	30.0	
9.5	45.0	20.3		9.5	18 27.6	26.8		9.4	21.7	23.6		9.4	50.7	20.0		9.5	17.0	7.5	
8.7	57.4	56.7		9.5	39.1	5.0		9.3	25.5	42.2		9.3	51.6	51.0	B	9.5	32.8	57.2	
9.5	3 9.6	19.5		9.5	41.0	39.8		9.4	27.9	40.9		9.1	44 2.0	57.0	A	9.5	42.7	27.4	
8.5	11.1	54.7		7.8	45.3	3.0	A	9.1	56.2	11.0	B	9.4	4.5	55.9	B	9.5	58.7	25.6	
9.5	19.2	58.1		9.5	19 6.2	29.0		9.5	32 1.1	11.5		9.5	5.9	5.1		9.5	56 9.3	24.5	
9.4	58.3	48.6		9.5	11.4	27.0		9.3	26.0	50.8	A	9.3	10.1	40.5		9.5	27.3	36.0	
9.0	4 14.6	17.5		9.4	16.8	4.1		9.5	31.6	2.7		9.3	50.1	3.0		9.5	31.0	4.8	
9.4	20.0	45.4		9.5	43.1	25.9		9.4	53.7	52.2		9.5	59.4	58.4		9.5	35.6	34.1	
9.2	25.4	37.3		8.5	51.1	7.8	A	9.1	33 16.0	39.5	A	8.3	59.4	56.2	A	8.7	58.3	44.4	A
9.5	34.1	30.9		8.5	57.9	29.3		9.3	21.6	19.6		9.5	45 23.9	54.9		9.5	57 6.3	17.6	
9.0	45.9	49.8		9.5	20 9.3	5.8		9.2	21.8	30.0		8.7	47.0	31.4	A	9.5	29.2	17.6	
9.5	56.8	20.1		9.5	21 5.2	31.2		9.2	26.7	26.3	A	9.2	46 5.2	39.5	A	9.5	32.4	17.7	
9.5	5 2.1	0.2		8.8	40.8	20.5	A	9.0	32.1	55.2	A	9.5	14.5	2.2		9.5	38.6	23.6	
9.5	34.9	45.7		9.8	59.0	59.5		9.5	33.2	21.9		9.1	42.1	15.2		9.5	43.6	23.6	
9.5	53.0	41.9		9.1	22 6.5	48.2		9.5	45.8	3.4		9.4	49.2	7.3		9.5	53.2	33.6	
9.1	57.6	5.5		9.2	11.1	46.0		9.4	50.7	12.1		9.2	47 12.7	48.4	B	8.6	57.9	26.1	A

501—560				561—620				621—680				681—740				741—800			
	1u—2u	+51°			2u	+51°			2u	+51°			2u—3u	+51°			3u	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	58 38.3	27.6		9.3	14 44.5	46.6		8.7	33 56.7	19.6	A	6.8	57 41.2	38.7	A	9.5	20 10.9	12.6	
9.5	50.3	12.2		9.3	49.4	13.9		8.5	34 36.9	40.6		9.5	58 26.7	16.5		9.5	18.2	2.1	
9.1	59 2.4	35.2	A	9.3	49.5	40.4	B	9.5	35 5.5	55.5		9.0	43.6	32.2	A	9.3	42.7	39.0	
9.3	7.1	6.4		9.4	15 1.1	8.6		9.4	24.3	7.7		9.3	59 5.5	12.7		8.4	21 47.3	34.0	B
9.5	11.8	16.5		9.3	1.1	7.6		9.3	36 44.9	24.2	B	9.5	36.2	36.7		9.1	22 7.4	24.3	A
9.4	39.0	20.4		9.0	7.7	13.3	B	9.0	45.8	36.2		9.1	59.2	49.1		9.3	23.3	29.3	
9.5	0 11.4	5.4		9.4	10.7	13.5		9.5	56.7	9.7		9.2	0 36.8	12.5		9.2	25.3	34.2	
9.5	13.5	45.0		8.8	21.8	43.7	B	8.8	37 0.3	31.3		9.1	1 17.2	58.8		9.5	44.6	23.2	A
9.2	27.0	2.0		9.5	32.9	2.1		8.5	41.5	42.6	B	7.3	18.5	37.6	A	9.3	23 0.4	5.1	
9.3	30.8	4.9		9.4	54.0	7.0		9.5	38 42.6	52.0		9.4	2 5.0	39.2		9.4	3.0	45.4	B
9.1	46.6	56.5		9.3	16 18.8	42.6		9.0	56.5	3.3		9.4	9.2	16.5	A	8.3	3.8	48.4	A
9.3	47.4	31.8		9.3	20.4	10.9		9.0	39 17.8	22.4		9.5	20.1	44.0		9.3	24 11.9	14.1	
8.9	1 0.1	6.7	A	9.4	23.2	20.5		8.9	20.7	2.1		9.1	23.6	58.4	A	9.5	43.3	45.0	
9.5	3.5	53.8		8.4	44.4	2.9	B	9.3	40 15.7	37.7		8.3	24.5	27.3	A	9.4	25 3.8	29.3	
9.0	39.2	27.3	A	9.0	51.8	24.4		9.1	23.0	13.7	B	9.5	25.4	0.4		9.4	27 32.1	7.5	
9.5	50.6	39.7		9.5	17 5.5	10.2		7.5	23.8	40.0	G	7.8	3 24.7	14.6	A	9.5	28 20.9	8.3	
9.3	2 5.9	6.9		9.4	16.4	0.9		9.5	26.3	47.6		9.5	4 9.7	49.2		9.5	45.3	29.3	
9.5	11.7	11.9		9.4	56.7	12.9	B	9.5	29.5	43.0		9.5	15.6	55.0		9.4	57.6	2.3	
9.4	39.9	40.6		8.0	18 9.7	53.5	G	8.3	41 13.7	49.5		8.6	22.4	2.3	A	9.1	29 46.4	51.5	A
9.5	4 0.3	18.9		9.0	16.2	2.0		8.3	52.2	36.8	G	9.3	32.2	0.8		8.8	47.8	33.3	
8.8	26.2	33.9		9.4	19 7.8	28.9		9.5	42 1.2	20.4		9.3	45.5	6.5		9.2	51.3	18.1	A
9.5	44.4	58.2		8.5	36.7	46.1	A	9.5	45.5	51.5	B	9.5	56.8	29.7		8.9	30 48.3	2.3	A
8.6	48.4	38.2	B	9.5	20 20.6	3.2		9.5	43 8.6	52.4		7.8	5 43.5	1.4	A	7.5	31 48.8	50.1	A
9.4	5 14.2	58.4		9.5	21 11.8	35.3		9.5	38.5	2.7		9.5	52.3	28.2		8.3	32 20.9	12.0	A
9.5	31.0	6.7		9.0	24.7	45.6	A	8.9	40.0	28.4	A	9.5	6 2.0	5.2		9.4	37.4	3.3	B
9.4	48.3	3.9		9.0	31.7	39.4	A	9.5	41.5	3.7		9.5	8.7	38.1		9.5	41.6	45.0	
6.8	49.2	49.5	G	9.4	52.8	40.2	A	9.5	46.0	0.8	B	9.4	11.3	8.6		8.8	33 30.7	20.2	A
9.5	55.8	58.6		6.5	23 24.3	39.7	A	9.2	44 0.8	27.9		9.2	7 7.6	10.6	B	9.5	34 34.9	15.1	
9.2	56.3	39.7		9.5	34.7	39.4	A	9.3	28.2	58.6	A	8.3	18.2	20.7	A	9.3	35 3.7	17.1	
8.2	6 29.8	11.4	A	9.5	53.3	42.6		9.3	29.7	0.3		9.4	8 22.7	29.3		9.0	5.8	56.5	A
9.5	30.9	40.5		8.5	24 4.4	59.8	A	9.5	38.0	46.1		9.5	53.8	5.4		9.5	6.4	8.7	
9.2	34.4	36.8	B	9.5	20.3	3.8		9.5	45 7.0	56.4		9.1	56.3	20.8	A	9.1	8.6	18.1	B
8.5	41.8	53.2	G	9.1	25.2	48.1	A	9.2	10.4	40.3	B	8.6	9 39.2	32.2	A	9.2	40.4	59.3	A
9.1	7 12.3	13.2	A	9.3	36.3	19.9	B	9.5	33.1	59.8		9.5	46.7	2.8		6.5	36 24.2	14.9	A
9.1	39.2	49.1	S	9.2	56.9	9.9		8.7	45.2	5.9		9.5	52.2	28.8		7.0	54.9	4.4	A
9.3	42.5	36.3		9.2	25 44.7	39.2	A	9.2	46 54.8	52.9		7.6	55.5	5.3	B	9.2	37 27.9	1.8	B
9.4	8 3.8	10.2		9.1	26 2.4	39.7	A	8.0	47 5.1	54.7	A	9.2	10 22.6	50.2		8.3	32.4	35.3	A
8.2	20.9	6.6	A	8.5	12.3	50.9	A	9.1	6.6	53.6	B	9.5	25.3	0.6		7.8	50.8	22.1	A
9.3	37.5	39.8		7.0	51.8	20.3	G	9.1	48 32.0	30.7		8.8	46.7	58.5	A	8.2	58.8	30.7	A
9.5	42.6	40.2		8.9	27 16.2	35.8	A	9.0	49 46.1	2.0		8.3	49.8	2.9	A	9.2	38 31.4	47.1	
9.5	44.8	43.9		9.1	33.3	15.6		9.5	50 5.6	16.0		9.5	11 18.9	2.2		9.4	36.2	47.9	
9.5	53.8	38.4		9.0	28 5.0	3.7		9.1	6.0	51.9		9.1	27.7	49.3	A	9.5	36.9	2.5	
9.2	54.0	33.8	B	9.4	12.1	0.8		9.1	10.5	1.0		8.8	56.6	8.3	A	9.4	39 5.4	1.5	
9.5	9 9.0	36.8		8.8	32.7	26.4		9.5	28.7	29.7		9.5	12 6.5	55.0		9.5	23.5	57.1	
9.5	10.0	38.4		9.4	29 25.0	16.4		5.7	33.7	47.4	A	9.3	45.5	43.8	B	9.5	35.4	57.3	B
9.4	30.8	9.1	B	9.4	37.2	12.4	B	9.5	52 33.2	27.3		8.7	57.7	37.6	A	9.2	36.9	33.4	
9.3	51.9	56.4		9.2	47.0	16.2		9.0	35.5	40.1	B	9.2	13 7.2	46.9	A	9.4	38.8	26.9	
7.0	54.2	52.5	G	9.5	51.8	12.2		9.2	53.5	39.4		7.8	11.8	14.0	A	9.5	54.7	33.4	
8.8	11 24.7	47.6		9.5	57.3	12.2		9.5	53 5.0	38.1		9.0	43.5	59.3	B	9.1	58.3	30.5	
9.4	28.4	5.9		9.4	30 13.1	2.3		9.0	40.2	56.5	A	9.3	15 3.2	30.2	B	9.5	40 52.6	15.5	
9.1	43.2	40.1		9.5	56.3	45.1		9.1	54 5.5	7.3		9.0	12.3	49.9	A	9.5	41 58.9	44.2	
9.5	58.8	16.7		9.1	59.7	36.8		9.4	33.9	56.2		9.4	35.5	24.4		8.9	59.2	2.3	
9.5	12 2.7	7.5		9.5	31 6.5	54.8		9.3	55 22.2	42.0		8.0	16 8.2	12.9	L	8.2	42 9.0	48.9	B
8.5	13 16.9	53.2	F	9.2	6.9	49.6		9.2	30.7	40.0		9.5	22.6	42.5		9.4	16.6	44.4	
9.4	21.7	42.1		8.7	32 2.9	31.6	B	9.4	51.0	9.8		8.8	49.4	39.2	A	9.4	36.8	51.0	
6.5	35.3	25.4	G	9.0	15.8	48.6	B	8.5	57.5	0.0	A	9.5	17 22.5	0.5		8.1	43 26.7	6.7	A
9.2	43.6	2.4		8.8	26.6	9.9		9.4	56 32.7	5.5		9.4	51.6	13.8		9.5	33.6	38.5	
8.5	59.7	41.6	L	9.0	34.0	16.0		8.8	57 5.6	47.4	A	9.5	18 57.8	39.2		7.8	54.0	59.5	
9.3	14 7.2	32.7		9.4	58.8	59.8		8.7	23.7	37.6	A	9.4	19 12.9	0.8		9.0	44 13.8	58.0	
9.1	26.9	59.2		9.5	33 31.7	47.5	B	9.4	31.9	53.3		9.5	31.8	29.8		9.0	18.4	3.9	

801—860				861—920				921—980				981—1040				1041—1100			
	3u	+51°			3u—4u	+51°			4u	+51°			4u—5u	+51°			5u	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	44 20.9	5.8		7.5	56 50.3	3.2	L	9.1	14 18.1	41.8		9.4	39 53.6	47.8		9.1	2 8.2	37.2	
8.9	44.2	49.5	A	9.2	57 15.7	16.6		9.5	21.4	37.7		9.2	41 6.0	44.1	B	8.8	13.0	28.8	
6.5	44.3	47.3	A	9.5	53.8	13.4		8.8	50.9	19.0		8.3	7.5	7.6	A	8.0	39.8	14.9	A
8.7	49.8	56.1	S	9.5	57.9	11.2		7.0	15 52.0	39.3	A	9.4	10.0	7.0	A	8.5	3 36.2	9.5	A
9.2	53.8	57.4		9.5	58 6.8	8.7		9.4	16 16.3	57.0		8.9	10.0	7.6	A	9.5	4 6.7	11.5	
9.4	45 50.6	4.1		9.5	21.5	40.5		9.3	22.4	55.9	B	9.2	13.5	4.2	A	9.4	13.2	8.9	
9.5	51.0	56.4		9.5	33.4	16.9		9.4	24.0	55.0		8.0	30.6	16.8	A	8.0	38.5	48.0	A
9.5	46 19.7	19.4		9.5	59 15.3	23.2		9.5	57.8	42.5		9.4	43.1	41.6		9.0	5 0.5	29.0	A
9.2	28.6	28.6		9.5	18.8	25.5	B	9.0	17 9.8	43.8	B	9.3	57.8	1.6		9.3	19.1	8.2	
9.1	29.1	44.6	A	9.5	41.2	5.3	B	9.4	17.2	56.0		9.4	43 3.7	49.9		9.2	6 20.0	20.5	
9.4	58.2	16.3		9.4	47.6	19.5		9.4	17.5	17.3		9.1	24.7	10.5	A	8.2	7 11.5	55.4	A
8.0	47 2.6	42.0	A	9.5	54.8	32.1		9.5	29.9	46.5		7.0	53.6	20.6	A	9.3	18.8	58.8	
9.4	8.5	10.8		9.5	56.0	5.4		9.3	51.4	44.6		8.6	56.5	49.1	A	9.5	8 35.0	23.9	
8.0	18.2	18.3	A	9.5	0 33.5	32.4		9.5	18 21.3	47.1		9.4	44 3.6	35.5		9.5	56.6	39.7	
9.5	45.1	57.4		9.5	50.7	39.5		9.0	19 0.8	32.1	A	9.0	9.0	7.3		9.0	9 45.5	16.0	
9.5	57.0	21.7		9.5	1 27.6	19.4		9.5	4.9	19.4		8.0	17.6	36.0	A	9.5	50.0	31.2	
7.8	48 0.3	4.7	A	9.5	31.7	6.0		9.2	11.2	39.3		8.9	37.9	4.3		9.2	53.9	51.6	
9.5	32.2	3.4	B	9.3	37.4	51.7	A	9.0	13.8	17.3	B	9.5	45.4	52.8		9.5	57.4	3.6	
9.0	36.4	53.8		9.2	50.2	52.6	A	9.3	15.8	56.1		8.2	54.3	51.5	B	7.8	10 22.0	20.0	A
9.3	47.3	14.0	B	9.2	2 42.3	52.4	A	9.5	19.2	17.6		8.9	54.6	30.0		9.5	41.3	51.4	B
9.5	53.4	13.7		9.5	49.4	37.4		8.0	27.4	58.7	A	9.0	46 34.2	52.8		9.4	49.4	49.8	
9.3	49 0.4	44.2		8.3	3 4.6	21.4		9.4	20 8.0	41.3		9.3	47 12.6	56.1		9.4	53.2	58.6	
9.5	5.0	7.4		8.5	8.1	27.0		8.9	45.2	7.1		9.3	24.8	58.7		8.0	11 14.2	4.5	F
9.5	25.9	19.0		9.5	15.5	59.6		8.5	58.7	52.9	B	9.5	37.6	29.0		9.2	12 15.0	45.5	
9.3	47.7	24.2		9.2	33.6	5.3		9.5	21 18.9	39.0		8.0	42.5	41.8	A	9.5	16.2	0.1	B
9.5	56.6	8.5		9.1	43.0	9.1		9.5	22.9	52.0		9.5	48 25.6	0.2		9.5	33.0	30.3	
8.5	50 4.7	44.8	A	9.4	4 29.9	9.9		9.2	32.2	32.8		9.4	49 12.8	8.6		9.0	13 16.0	29.8	
9.2	10.9	34.0		9.3	47.8	21.4		9.3	22 20.6	3.5		8.9	32.6	16.3		9.4	37.7	32.7	
9.5	55.7	6.7		9.5	5 7.4	51.6		9.3	30.7	51.3		8.6	50 57.4	28.1	A	8.9	59.9	28.9	A
9.4	58.8	25.0		9.5	10.0	47.1		9.2	31.6	5.2		9.0	51 24.1	50.2		9.5	14 58.5	42.5	
9.4	59.8	24.5		9.5	25.9	31.2		9.4	23 16.4	43.1		9.5	49.8	35.2		9.5	17 2.1	8.5	
9.5	51 12.2	51.1		9.5	30.3	14.9		9.3	29.4	2.6		9.0	52.5	0.8		8.4	27.5	38.0	
8.9	14.9	14.7	A	8.6	33.5	0.3	A	9.5	59.6	51.1		9.5	58.8	29.2	B	9.4	18 3.9	39.5	
9.3	30.8	14.1		9.5	6 2.1	0.4		9.1	24 31.1	13.9		9.5	52 0.1	12.8		9.5	19 5.0	21.8	
8.9	43.5	44.0		9.5	11.8	46.5		9.4	51.6	29.5		9.4	53 4.1	42.8		8.9	21.8	11.2	B
9.5	59.1	7.9		9.5	31.8	11.5		8.4	25 43.7	58.7		8.9	30.2	41.3		7.5	45.8	9.8	A
9.5	52 16.5	24.6		9.1	42.7	54.0	A	9.2	26 5.1	39.4		9.1	33.1	43.8		9.2	48.8	11.1	A
9.3	17.6	3.5		9.5	7 1.5	51.5		8.9	27 28.2	42.8		9.4	41.0	54.7		9.3	20 11.2	22.7	
9.1	34.8	26.6	A	7.3	26.8	39.2	A	9.4	42.5	52.9		9.5	54 12.2	43.5	B	9.1	33.5	16.7	B
9.3	35.8	39.6	A	9.5	43.0	24.5		9.0	28 7.1	20.6	A	8.5	23.5	1.7	B	7.5	34.6	6.1	A
9.0	40.1	43.0	A	9.5	8 10.3	37.7		9.4	29 5.0	9.0		9.5	55 6.1	7.5		9.0	21 32.8	14.9	A
9.5	46.6	31.5		9.5	19.0	19.5		9.5	20.8	25.0	B	9.5	6.4	44.3		9.2	47.1	28.7	A
8.5	50.7	29.3	A	9.0	42.7	44.3		9.2	22.9	8.1		9.0	17.6	32.5		8.2	48.3	20.3	A
9.5	53 16.8	4.0		9.0	49.5	54.6		9.5	30 51.1	22.1		5.2	20.3	23.7	G	9.2	22 17.7	12.6	B
9.5	20.9	15.1		9.3	9 21.9	49.6		9.3	59.4	14.3		9.2	21.8	58.3	B	9.5	32.6	5.6	
9.5	31.1	4.9		9.5	50.0	16.7		9.5	31 29.6	19.2		9.1	30.1	24.1		9.0	36.7	16.9	
9.5	58.8	16.3		9.5	10 4.6	29.7		9.5	32 5.1	38.9		8.5	40.1	30.1	B	8.0	23 3.7	48.8	A
9.3	54 10.4	35.0	B	9.5	25.2	15.0		9.5	44.6	19.2		8.5	47.4	56.3	A	9.2	21.1	29.1	
9.5	46.7	49.7		9.5	37.8	11.8		9.5	33 5.7	38.5		9.2	50.0	27.1		9.0	22.6	10.5	
9.0	55.8	36.0		9.5	55.0	39.8		9.5	19.2	35.0		9.4	56 3.4	15.7		9.1	25 43.7	49.3	
9.5	55 16.5	4.5		8.8	11 21.0	27.5		9.3	46.1	34.0		8.8	26.9	54.9	A	9.4	56.9	12.5	
9.0	51.0	42.5		8.0	25.4	14.9	A	8.1	35 23.4	2.7	A	9.2	47.5	2.3		8.8	26 4.6	17.9	A
9.5	53.6	39.8		7.5	29.2	35.3	A	8.1	36.4	44.9	A	9.1	57 22.0	48.9	A	9.2	34.9	15.5	B
9.5	56 10.3	59.8		9.5	59.9	3.5		9.5	46.6	38.7	B	9.5	31.8	9.5		7.9	53.9	20.7	B
9.3	12.0	50.6		9.5	12 9.6	1.4		9.5	36 0.5	9.2		9.2	58 38.5	37.7		9.5	57.0	27.4	
8.6	16.7	13.9		9.3	24.7	29.2		8.8	1.1	22.1	A	9.5	59 18.4	59.1		8.4	28 5.6	14.9	A
9.4	18.2	43.2		9.5	34.6	15.5		9.0	37 11.1	17.8	A	9.0	0 15.9	52.0		9.2	16.6	6.6	
9.5	28.3	31.7		9.5	46.4	4.7		8.5	39 5.7	54.1	L	9.3	44.0	29.3		9.4	25.2	40.0	
9.5	31.9	19.1		6.6	13 7.2	35.0	A	9.4	21.2	2.5		9.2	46.3	26.4		9.5	39.4	48.8	
9.5	39.1	2.2		9.2	48.5	48.5		8.6	44.4	58.7	B	9.5	1 33.6	9.5		9.5	29 55.6	9.1	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	5ᵘ	+51°			6ᵘ	+51°			6ᵘ	+51°			6ᵘ—7ᵘ	+51°			7ᵘ—8ᵘ	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	30 9.6	35.0		8.0	1 12.4	41.8		9.4	27 37.6	8.4		9.3	56 28.2	25.5	B	9.2	30 15.8	37.8	
9.5	25.2	9.1		8.9	18.2	47.9		9.3	28 3.8	35.2		9.5	29.2	31.2		8.5	19.4	16.0	A
9.3	33 2.7	58.7		6.0	2 20.4	11.9	A	9.5	29 4.3	11.1		7.8	57 11.7	35.9	A	9.5	42.5	0.5	
9.3	26.2	39.0		8.3	58.3	11.5	A	9.4	42.5	55.9		9.5	20.3	16.8		8.7	31 23.9	36.5	A
9.5	40.0	7.6		9.4	3 10.5	56.3		9.5	30 14.3	11.5		9.4	58 49.8	17.3		9.2	32 46.6	2.4	A
9.5	34 12.0	32.0		8.5	13.1	26.2		9.4	19.7	50.6		9.5	50.2	34.5		9.3	33 1.8	26.8	B
9.5	16.4	38.5		9.5	42.5	50.3		9.5	56.8	47.9		9.0	58.3	39.0		9.5	21.0	32.4	
9.3	35 15.5	24.0	B	9.3	4 6.6	34.5	A	8.7	31 4.7	14.0		8.2	59 13.0	59.0	A	9.5	31.5	15.1	
8.8	22.0	2.0	A	9.5	28.5	28.7		7.3	32 36.7	35.6	A	9.1	0 17.3	54.7		8.5	34 3.1	11.3	A
8.6	30.3	23.4	B	9.5	5 0.0	10.5		9.3	33 55.3	27.2		9.5	28.8	17.6		9.5	30.0	5.3	
6.4	33.0	26.2	G	9.5	8.2	53.6		8.2	34 46.7	58.1	B	9.3	37.3	5.0		7.5	35 11.8	22.5	A
8.1	37 13.6	6.1	A	9.5	6 53.5	16.9		9.5	52.8	45.8		8.8	46.4	37.5		9.2	31.7	17.3	A
9.5	27.0	40.9		9.5	7 3.9	30.0		9.3	35 8.3	37.5		9.5	1 3.8	19.8		9.4	38.8	50.3	
8.2	38 23.0	19.3	A	9.4	34.7	46.2		9.1	22.9	49.8	B	9.5	34.4	21.7		9.5	36 10.4	10.8	
8.8	25.9	11.4	A	9.5	8 25.3	38.4		8.5	36 5.8	55.8	B	6.0	2 5.4	39.0	A	9.5	15.3	58.4	
9.3	39 10.1	59.5		9.0	26.4	1.6		9.3	41.5	50.5		9.3	18.9	20.6		9.1	30.6	9.2	B
6.3	27.0	28.2	A	9.5	55.7	25.6		9.0	37 43.8	32.1		9.2	39.6	22.8		9.3	38 7.8	48.4	
9.5	58.2	21.2		9.5	9 3.8	46.3		9.5	39 10.2	38.6		8.4	45.5	36.8	A	9.0	27.5	14.9	A
9.5	41 2.2	47.8		8.9	40.0	47.2	A	8.6	20.5	45.9		9.3	3 12.7	33.3		9.4	39 3.4	5.8	
9.5	14.6	39.4		9.3	10 19.4	11.3		9.3	27.1	16.5		9.4	17.3	1.3	B	9.4	13.3	58.5	
9.1	51.2	49.3		9.2	20.2	17.8		9.3	33.5	7.5		9.4	26.5	56.0		9.3	13.5	32.5	B
9.2	57.2	42.2		8.7	39.8	50.6	A	8.7	36.1	18.2	B	9.3	45.6	26.5		8.2	28.8	43.4	A
9.5	42 59.7	37.5		9.2	11 19.3	34.6		9.4	40 3.4	1.1		7.5	4 13.5	40.7	A	8.5	51.4	28.1	A
9.0	43 1.1	45.3		8.2	54.3	37.1	B	9.1	13.6	34.6		9.2	25.1	9.4		8.5	41 2.2	59.2	A
8.3	58.0	5.4		7.0	12 58.8	8.6	B	9.5	58.5	56.8		9.3	5 38.8	58.6		9.3	53.8	50.4	
8.8	44 34.2	50.3		7.4	13 43.9	41.8	A	9.3	41 22.0	46.2	A	9.2	44.6	20.0	A	9.3	59.2	48.0	A
8.5	43.7	31.0		9.4	48.5	26.6		9.0	26.3	34.4	A	8.3	6 26.5	54.3	A	9.5	42 11.3	18.7	R
7.0	44.8	45.4	G	8.9	14 20.9	56.8	B	9.3	59.8	48.2	A	9.4	7 13.1	12.2		8.2	18.7	40.1	A
8.5	45 20.9	31.1		9.2	23.3	56.9	B	7.5	42 3.0	40.4	A	7.7	8 4.1	44.6	A	9.2	31.2	48.4	
8.5	24.0	44.0	F	9.3	15 46.6	58.4		8.2	7.8	48.1	A	9.5	9 17.2	42.6		9.1	43 28.4	5.8	R
9.5	42.2	31.1		9.5	17 5.4	50.6		8.3	25.8	39.9	A	9.1	30.6	9.3	A	9.5	49.1	10.2	
9.2	46.1	5.1		9.1	19.7	58.1		9.4	43 11.9	20.7		9.5	10 33.0	54.4		8.8	44 29.7	53.9	A
8.8	46 44.2	6.1		9.4	18 23.3	30.8		9.3	44 5.3	49.2		9.0	35.0	19.3	A	8.7	45 21.3	32.5	A
9.5	57.1	16.9		8.0	24.9	27.6	A	9.3	12.3	14.0	B	8.9	59.6	33.3	A	9.5	47 4.3	56.8	
9.5	47 26.7	58.2		9.3	40.8	52.3		8.8	28.8	53.2	A	9.5	11 46.3	4.4		8.0	11.4	43.9	A
9.5	59.4	14.8		9.3	58.7	41.7		9.4	45 3.3	47.8		9.1	13 19.4	52.4		9.5	15.0	34.2	B
9.5	48 26.2	32.5		9.0	19 7.2	52.0	B	9.1	34.1	59.1	A	9.2	36.1	29.5		9.0	48 2.1	25.0	
9.0	38.0	24.7	A	9.5	14.8	9.0		8.0	37.9	9.6	A	9.5	16 2.6	21.1		9.1	18.4	49.8	
6.7	46.5	2.7	A	9.5	29.6	54.7		9.5	47 8.8	1.1		9.5	4.0	29.5		9.4	27.3	42.5	
8.9	57.2	6.2	A	8.8	35.9	46.7	A	8.0	24.7	32.1	B	8.9	17 14.0	7.2	B	9.3	29.0	30.7	B
8.8	49 31.0	4.1	A	9.3	36.2	27.8		7.9	48.3	0.6	A	9.0	54.6	2.2	A	8.5	49 35.8	3.3	A
9.1	51 10.8	0.2		9.2	40.0	29.2		9.5	48 1.8	28.6		9.3	18 33.1	7.5	B	9.5	50 15.4	40.5	
9.0	12.4	9.5	A	9.2	44.7	30.3		9.5	55.6	38.5		8.6	38.8	56.5	A	9.2	51 15.9	41.4	A
8.1	42.1	14.4	A	9.5	20 44.8	18.8		8.8	49 39.4	56.5	A	8.5	20 12.3	49.6	A	8.3	53 46.4	19.7	A
9.5	52 36.2	6.1		9.2	58.0	50.5		8.1	50 2.2	56.8	A	9.5	22.6	49.0		9.4	54 40.1	45.4	
6.3	53 1.0	34.6	A	7.5	21 12.2	3.7	A	9.2	4.5	17.3	B	9.5	21 21.0	55.8		9.0	56 35.5	18.7	A
9.5	7.9	12.3		9.4	28.7	0.7		8.8	7.4	34.0		6.5	22 42.5	36.8	L	9.2	44.2	18.2	
9.4	8.3	19.4		9.5	33.0	57.2		8.6	37.8	28.6	A	8.1	23 27.0	50.3	L	9.5	56.4	25.6	
9.1	17.6	41.3		9.5	22 17.6	46.3		8.8	39.5	51.6	A	9.5	24 7.8	50.3		9.4	57 6.5	55.4	
8.5	54 7.7	53.0	A	9.0	27.2	6.5		7.5	55.8	45.6	A	9.5	25 18.3	35.8		9.1	9.3	50.0	A
8.5	27.6	27.7		8.0	23 1.7	11.8	A	9.3	56.6	31.4	B	9.5	30.0	10.8		5.1	33.5	55	
8.8	36.7	32.0		9.5	46.8	49.2		8.5	51 38.3	36.9	A	9.5	26 38.8	2.8		8.2	58 9.8		
8.7	55 59.2	58.5	A	9.0	52.6	53.5		9.4	40.4	25.4		9.5	45.7	49.9		8.7	25.[illegible]		
9.2	56 6.9	21.4	B	9.2	24 23.0	24.6		9.0	52 33.6	46.3		9.5	27 31.2	28.0		9.4	0 42.[illegible]		
8.5	6.9	25.2	A	9.4	25 8.5	45.9	B	9.1	38.8	16.8	A	9.1	41.9	30.2	A	9.5	1 [illegible]		
9.5	57 23.4	1.6		8.5	10.8	32.4	A	7.7	43.8	28.6	A	9.5	28 13.6	21.3		9.1	3 [illegible]		
9.4	34.7	49.3		9.5	20.3	46.7		9.4	53 13.3	52.3		9.5	29 7.8	25.6		9.2	[illegible]		
8.0	52.9	32.1	A	9.5	39.7	52.0		9.4	34.3	10.9		9.3	8.9	29.2	A	9.3			
9.0	59 23.3	16.4	B	9.0	51.3	37.5		9.4	53.8	9.6	B	9.5	22.2	55.0		8.6			
9.5	56.7	23.7		8.0	26 42.9	18.8	A	8.9	55 43.3	37.5		8.3	30 10.9	47.6	A	9.1			

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	8ᵐ	+51°			8ᵐ—9ᵐ	+51°			9ᵐ—10ᵐ	+51°			10ᵐ	+51°			10ᵐ—11ᵐ	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	7 27.6	51.8		8.6	47 31.6	42.4		9.0	21 33.7	2.8	A	9.5	1 55.0	42.7		9.2	50 22.1	48.7	
9.1	34.7	54.6	A	8.7	33.1	59.2		9.5	22 51.0	21.1		9.4	3 46.2	49.7		9.0	36.8	46.2	
9.5	56.3	6.6		9.5	54.2	10.7		9.1	25 56.2	8.7	A	9.1	46.7	1.2	A	7.6	51 14.9	41.1	B
8.8	8 42.2	47.7	A	9.0	48 30.3	23.6		9.4	26 17.5	44.8	A	9.0	4 0.8	31.9	A	9.4	22.5	0.8	
9.3	52.5	46.1		8.5	49 3.7	43.9	A	9.4	52.1	15.1	A	6.5	28.4	12.7	A	9.3	53 7.0	46.3	
9.0	55.7	34.4	A	9.0	41.8	43.4	A	9.5	27 2.5	13.7		8.5	35.9	0.7	A	9.3	54 27.6	1.0	A
8.0	9 10.7	43.2	A	9.5	50 20.2	12.2		9.5	34.7	47.8		9.5	5 38.8	19.6		9.4	56 7.4	45.1	
9.0	32.0	28.9	A	8.5	25.6	29.0	A	9.5	35.2	39.9		9.4	45.3	47.1		8.5	57 24.3	36.5	A
8.7	34.2	46.2	A	9.5	42.7	22.6		8.9	49.8	22.0	A	8.6	6 39.6	29.9	A	9.5	58 51.5	55.0	
9.4	10 33.2	43.3	A	9.5	58.5	1.4		9.5	29 4.8	25.5		8.2	42.7	3.6	A	9.4	59 18.8	18.9	B
9.5	35.8	56.7		9.5	51 19.6	28.6		9.5	26.2	43.4		9.2	11 6.8	51.2	A	9.5	1 54.0	43.7	
9.5	11 59.2	16.0		9.5	43.2	48.2		9.5	30 52.9	53.8		9.3	8.6	3.1		9.4	3 35.4	50.1	
9.0	12 16.2	24.5	A	9.4	46.8	41.4		8.9	31 31.2	33.5		9.2	57.5	16.0	A	9.0	50.8	52.6	A
9.5	44.3	12.6		9.5	52 30.0	57.4		9.0	54.3	34.4		9.0	12 11.0	5.7	A	9.2	4 12.8	51.1	A
8.7	49.1	41.1	A	9.3	57.2	58.7	B	9.1	32 5.2	13.9		9.5	45.0	11.7		9.0	46.4	25.8	A
8.5	50.4	7.6	A	9.5	53 27.8	20.6		7.5	56.1	55.6	B	9.5	56.1	41.8		8.8	5 21.6	58.9	A
9.4	59.2	56.8		9.2	54 49.3	15.7		8.0	33 10.5	14.8	B	8.0	13 21.9	13.6	A	9.4	7 42.1	1.2	
9.3	14 52.4	33.9	A	6.8	55 5.1	23.9	B	9.5	36.0	18.0	B	9.5	14 38.3	51.2		9.0	43.4	25.8	A
9.5	15 39.1	59.4		9.1	15.7	35.0		9.5	34 2.0	15.8		9.4	15 39.6	54.6	B	8.7	8 59.3	57.2	A
9.5	54.3	15.0		9.4	56 5.1	32.9	A	9.2	36 8.8	31.4		9.5	17 2.5	32.9		9.0	9 21.4	3.2	
8.3	17 1.5	34.0		9.4	7.2	44.4		9.5	22.0	58.8		8.9	24.5	48.2	A	9.5	10 24.5	33.3	
8.0	5.3	21.5	L	8.5	25.6	12.7	A	9.4	37 33.8	36.4		9.5	32.1	45.2		9.0	13 49.9	29.3	A
9.3	14.0	58.3		9.5	57 44.8	29.0		8.5	55.1	37.4	B	9.5	56.6	16.1		7.5	17 10.8	17.5	A
9.2	18 54.6	48.6	A	9.2	58 32.8	53.0		9.4	38 23.8	25.5		6.6	21 10.5	44.7	G	9.3	18 7.1	9.0	B
9.5	56.4	24.6	B	8.0	45.3	22.6	A	9.1	39 11.7	33.4	A	6.2	15.0	18.7	A	9.5	30.1	10.0	
9.0	59.0	48.9	A	9.3	0 24.7	37.6	A	9.5	26.5	24.5		9.0	24 57.1	30.4	A	9.4	39.7	13.4	
8.5	19 4.5	39.6	A	9.1	54.3	53.6	A	9.2	47.2	17.6	A	9.2	25 5.6	8.5	A	9.4	21 0.1	31.5	B
8.4	7.0	7.4	A	6.5	1 48.7	2.8	A	9.2	53.8	56.2		9.4	21.0	0.8		8.7	8.4	3.6	A
9.5	11.2	15.8		9.0	4 27.6	2.8		8.8	40 23.9	47.8	A	9.3	31.3	48.7		9.5	24.9	37.7	
7.8	21 7.5	11.4	A	9.3	57.2	45.3		9.0	28.4	36.4	A	9.3	39.2	4.8	B	9.0	40.8	0.1	A
7.5	21.0	6.4	A	9.4	5 15.8	19.1		9.0	41 27.7	41.9	A	8.8	27 58.5	24.2	A	9.5	44.9	44.7	
9.4	51.4	59.3	A	8.6	6 2.1	16.1	A	9.2	34.2	48.8		8.8	59.3	27.4	A	9.3	22 49.5	20.4	
8.8	22 9.6	15.3	A	9.0	59.8	54.9		7.0	43 41.3	18.6	A	9.4	28 19.7	14.6		9.3	58.4	14.5	
8.6	18.3	7.8	A	8.5	9 52.7	4.7		8.9	44 19.7	23.5	A	9.5	21.5	29.5		9.5	24 12.8	10.0	
9.1	23.3	53.4	A	6.5	10 38.4	53.3	A	8.2	31.7	12.7	A	8.4	23.0	19.5	A	9.1	25 23.4	32.3	
9.3	27.1	58.8		8.2	58.7	54.6	A	9.5	45 26.9	59.7	B	9.5	54.2	23.0		9.4	26 1.8	59.6	
8.8	52.6	30.1	A	9.5	11 46.2	37.6		8.4	46 22.0	53.0	A	9.2	30 6.1	50.7		7.3	29 15.4	57.3	A
9.2	24 27.1	10.4	B	neb	58.2	35.1		9.3	46.1	29.7		9.2	31 4.8	53.3		9.4	42.5	31.8	
8.8	28 4.9	58.9	B	8.3	12 25.7	37.4	A	9.5	48 29.8	39.4		9.3	32 48.1	40.3		6.0	30 1.9	25.9	A
8.7	15.3	9.9	A	8.4	37.7	13.2	A	9.0	49 25.0	21.0		9.5	54.5	51.7		9.5	10.0	11.0	B
9.5	26.1	0.0		9.1	13 9.2	23.5	A	8.5	40.0	40.8		6.5	34 4.4	33.8	A	9.5	31 49.9	24.4	
8.5	30.2	58.9	B	9.5	20.2	13.7		9.5	50 47.7	58.8		9.5	36 34.0	22.0		9.5	32 7.8	12.0	
7.0	30 7.9	56.1	F	9.4	25.4	50.5		8.3	49.3	55.8	B	9.5	37 29.5	30.9		9.2	35 20.9	13.0	
9.3	19.2	19.2		9.4	38.0	55.7	B	8.6	51.3	18.5	B	9.0	38 25.0	23.4	A	9.0	29.8	24.4	
9.3	31 4.7	16.1		9.2	56.7	33.5		9.5	52 5.0	55.6		8.0	40 7.6	22.9	A	9.1	45.8	31.8	
8.8	47.1	10.2	A	9.0	14 43.2	48.3		7.5	26.3	11.6	F	9.4	41 32.9	6.1	B	9.5	36 14.4	43.7	
9.1	33 5.5	53.9	A	8.5	43.3	31.9		9.3	35.8	37.3		9.5	49.4	20.0		9.1	33.5	54.6	A
9.1	35 17.1	20.6	A	9.1	15 27.7	33.0		9.4	56.6	55.8		9.0	42 42.5	43.2		9.3	51.7	51.1	
9.1	23.6	25.4		9.5	28.3	45.2		9.3	53 25.0	30.4		8.3	54.8	1.7	A	9.5	37 16.9	57.3	
9.1	52.7	29.5		9.3	44.7	9.7	A	9.4	54 26.5	28.9		9.2	43 22.5	23.0		9.3	39.6	54.1	
8.7	57.5	50.7	A	9.4	16 16.7	58.2	A	9.3	55 37.1	30.4	B	8.9	25.0	53.6		9.4	52.9	51.1	
8.8	37 48.7	42.9	A	9.5	53.2	43.4		7.0	50.5	14.6	A	6.2	32.4	1.8	A	9.1	59.8	37.3	A
9.2	38 34.4	39.4	A	9.5	17 6.3	59.2		7.5	56 23.4	38.8	A	9.2	44 32.0	9.7		7.3	38 25.9	21.9	A
8.1	58.7	13.2	A	9.5	9.7	29.0		9.5	58 26.0	38.9		8.9	33.8	47.2	B	8.9	46.0	24.8	A
9.5	39 47.8	13.7		9.5	19.9	22.5		9.5	30.5	8.7		9.4	45 28.6	6.1		9.3	56.0	57.9	B
9.1	40 54.7	31.0		9.3	18 31.4	58.8		9.5	59 3.5	34.8		8.2	46 37.8	41.2	B	9.3	39 3.5	43.2	
9.4	43 23.6	23.5		9.5	19 3.2	48.9		7.1	48.4	32.9	A	9.5	47 50.4	19.1		9.3	20.0	47.1	
8.9	44 4.8	46.8		9.5	5.7	21.6		9.2	0 19.1	45.4		9.5	48 23.5	17.9	B	9.3	31.9	35.3	A
9.5	45 7.3	5.2		9.5	20 12.8	12.7		9.1	31.7	43.4	B	9.3	33.0	3.1		9.5	58.2	58.5	
7.2	46 51.6	17.6	B	9.5	14.7	40.9		9.5	1 2.0	20.5		9.0	49 28.7	29.4		9.5	40 37.6	44.7	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	11u—12u	+51°			12u—13u	+51°			13u	+51°			13u—14u	+51°			14u—15u	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	41 26.8	24.9		9.0	21 58.6	7.3	A	8.4	7 8.3	53.9		8.0	50 2.9	55.8	A	9.4	34 30.3	2.6	
9.5	35.0	40.7		7.9	23 48.1	47.0	B	9.5	25.4	38.5		8.9	48.0	9.9	A	8.1	41.7	37.9	B
9.5	42 6.9	51.6		9.5	25 48.3	19.2		9.5	8 3.4	42.7	B	8.3	51 38.7	14.9	A	8.9	35 37.8	35.4	
9.5	19.5	28.8		8.6	26 17.3	53.8	A	8.0	9 19.8	35.5	A	9.1	53 52.2	26.8	A	9.1	36 28.0	57.7	
9.1	43 47.7	20.4		9.3	40.8	23.5		9.5	50.5	59.2		8.6	58.0	12.9	A	8.6	39 1.8	13.8	B
9.0	44 18.8	2.2	A	9.5	27 50.4	23.5		8.3	10 26.8	20.6	A	9.5	54 5.3	45.3		9.5	24.7	57.1	
9.0	32.4	25.3	A	9.5	28 30.3	42.4		9.3	11 48.9	15.2		9.5	55 41.0	56.7		9.4	29.8	52.4	
9.5	45 8.0	27.3		9.4	30 51.0	3.2	A	9.1	50.8	20.7		9.3	56 10.7	1.5		9.3	39.5	2.8	B
9.5	27.5	41.2		9.1	31 12.5	47.8		7.8	56.7	12.7	A	6.0	57 37.5	40.8	A	9.1	40 34.9	36.3	
9.2	46 42.8	21.4		9.2	43.7	38.4	B	8.5	13 41.9	12.3	A	9.5	0 52.6	11.8	B	9.5	44.9	46.7	
9.5	47 44.1	31.8		8.4	49.8	53.4	A	9.5	48.4	23.5		9.5	3 19.6	57.2		7.0	41 40.3	0.0	A
9.4	46.5	9.0		8.4	51.1	40.2	A	8.7	14 16.7	11.8	A	8.3	31.4	18.9		9.0	42 18.8	24.8	
8.0	54.9	49.1	A	9.4	32 48.3	44.8		9.5	17.2	59.7		9.5	40.8	46.1		9.5	29.4	23.8	
9.0	49 11.4	25.4	A	9.2	58.5	47.3	A	9.5	15 19.4	36.3		9.4	5 2.0	46.4	B	8.5	53.3	2.4	A
9.5	51.9	48.1		9.5	33 54.2	20.1		9.5	16 31.0	44.9		9.3	6 13.8	17.9		9.3	43 20.7	51.2	
9.5	50 14.0	23.9		9.3	34 21.3	18.6		9.5	17 2.4	37.5		9.5	34.2	36.3		8.9	34.2	51.9	B
9.4	52 7.7	14.1		8.8	34.8	13.2	A	8.6	14.9	9.8	A	9.5	7 25.2	2.0		6.3	44 50.7	58.9	S
9.0	19.9	51.6	A	8.7	35.5	1.9	A	9.0	23.5	50.0	A	8.8	36.8	3.4	A	8.8	45 54.7	54.7	
9.5	53 44.9	31.3		9.5	35 13.3	55.0	B	8.7	18 40.4	54.2	A	7.5	40.8	24.3		9.4	46 13.0	11.4	
9.4	55 3.0	49.1		9.3	37 44.9	50.0		8.8	54.6	53.4	A	8.3	8 26.5	58.3	A	9.5	23.8	14.4	
9.2	56 19.8	26.8		9.3	38 45.3	20.1		9.0	20 8.2	22.1	A	9.0	9 23.3	26.4		9.3	26.4	55.4	
9.5	57 7.0	52.3	B	9.2	39 10.3	39.9		9.4	11.3	38.7	B	8.3	10 2.8	44.9		9.2	47 0.7	49.5	
9.0	7.4	2.2	A	9.5	40 9.4	40.4		9.3	48.6	28.1	B	7.5	11.3	7.4	S	9.5	50.4	11.4	
9.5	11.2	9.5		9.3	28.8	51.3		9.5	21 4.1	58.6		8.2	29.7	40.3		9.5	48 0.2	42.7	
8.2	35.2	5.6	A	9.3	42 30.2	42.3		8.8	22 1.4	11.8	A	8.9	49.3	47.2		8.8	21.3	13.9	
8.2	58 32.1	6.5	A	9.5	55.7	41.4		7.5	15.9	19.7	A	8.0	11 7.8	11.9		9.2	24.7	51.5	
9.5	0 24.0	20.5		9.5	43 56.4	39.9		6.7	47.8	28.5	A	8.5	53.2	40.3		9.5	46.3	14.9	
9.0	1 32.6	12.1	A	9.2	44 9.8	9.4	B	9.2	25 2.4	22.6	A	6.8	12 12.3	58.8	A	8.8	50 0.3	13.4	
9.5	33.5	53.9		9.0	12.7	35.0	A	9.2	43.3	31.0		9.4	13 44.0	57.5	B	9.4	52 38.9	35.3	
9.5	49.1	1.8	B	9.0	15.3	16.6		9.5	27 12.4	1.9		9.0	14 19.8	58.1	A	8.1	50.7	26.2	B
9.4	2 7.2	50.1	B	9.5	45 8.8	33.5		8.3	34.5	53.5	A	9.5	16 7.1	15.9		9.0	53 28.7	30.8	
9.4	3 24.3	16.1		8.0	45.7	4.3	B	8.1	57.4	41.5	A	9.5	33.6	28.9		7.3	55 55.8	8.9	A
7.8	32.6	21.0	R	9.2	46 8.4	50.8		9.5	29 24.3	28.6		8.2	55.5	47.2	A	7.9	59.9	22.9	B
7.9	4 24.8	38.7	B	8.8	14.4	59.5	B	9.5	30 20.4	51.9		9.3	17 26.0	57.4	A	9.5	56 27.2	56.1	
9.0	40.9	51.2		9.5	47 48.2	1.8		9.4	31 48.9	11.8		9.5	18 24.2	13.0		8.9	57 23.3	13.8	A
9.5	5 18.1	17.7		9.5	48 22.0	57.5		6.5	54.1	26.6	S	7.9	19 59.4	35.9	B	9.3	53.7	1.0	
9.2	18.1	12.2		8.9	50 1.6	52.0		9.2	32 3.4	48.3	A	9.0	20 8.5	46.2		9.4	0 22.0	55.2	
8.4	24.2	5.2	B	9.3	22.8	35.0		8.0	15.5	42.0	A	9.5	22.6	42.3		9.2	1 40.6	58.9	B
9.2	8 3.0	27.5		9.3	59.4	36.4		7.0	34 27.9	15.7	A	9.2	21 42.1	24.8		9.0	2 59.7	28.8	
9.4	11 17.3	26.4	A	9.5	52 45.8	29.5		8.7	56.9	33.0	A	9.0	43.4	23.5	B	9.0	3 40.6	13.9	
9.5	42.0	48.7		9.3	54 33.5	47.3		9.3	35 44.3	38.0		8.4	51.3	3.5		7.9	4 35.9	35.1	B
9.2	47.9	58.2	A	7.4	56 30.8	48.3	A	9.0	36 12.4	39.0	A	9.5	22 0.8	53.1		9.4	38.6	45.3	
9.5	12 20.8	11.2		8.4	58.4	4.3		9.3	37 34.0	18.6	B	9.5	23 19.3	22.4		8.9	46.5	40.8	
9.4	13 7.2	23.3		9.2	57 31.0	47.8		9.2	38 9.9	0.9		9.5	25 19.9	34.3		9.5	5 30.2	40.3	B
9.5	29.4	19.2		9.5	58 16.2	39.0		9.0	22.4	56.1		9.5	48.8	26.5	B	9.5	6 39.7	22.0	
9.4	14 10.8	47.3		9.3	21.5	18.2		9.2	31.3	0.9		9.5	26 1.3	55.7		9.5	45.3	43.4	
9.5	24.6	2.3	A	7.8	24.6	58.2	A	9.1	40 50.9	14.2	A	8.4	49.6	33.3	A	9.0	45.3	16.1	
9.5	49.0	29.5		8.8	59 8.3	46.8	A	9.0	41 29.9	31.0		7.8	52.2	40.3	A	9.5	7 33.9	1.1	
9.4	15 12.1	18.1		9.2	12.6	57.9		9.5	44 2.9	12.9		8.4	27 33.8	27.9		9.4	10 22.3	19.9	B
9.5	16 7.3	40.9		9.5	0 28.5	8.8		8.3	34.8	4.5		9.0	28 41.8	34.8		6.3	11 25.3	28.6	B
9.5	51.4	20.7		9.0	41.8	40.9		9.5	45 13.2	46.3		9.1	42.0	14.5		9.4	31.5	3.8	
9.2	57.5	58.5		9.3	1 15.3	40.9		9.0	30.7	28.3		8.8	29 45.1	17.8		8.7	33.1	28.2	B
9.4	19 28.0	30.2	B	9.2	43.4	7.3		9.5	46 0.8	21.4		9.5	30 5.7	50.9		8.9	15 5.0	57.7	A
7.3	51.1	59.5	A	9.3	47.8	17.2		7.9	21.3	51.9	A	8.7	11.4	37.7	A	9.5	50.1	38.9	
9.2	52.8	2.3	A	9.0	50.4	40.9		9.5	33.8	54.4		9.0	56.3	9.6		9.4	16 36.4	17.6	B
9.5	20 7.3	18.1		9.5	2 18.5	35.5		8.5	47.2	2.9	A	8.7	58.4	30.5	A	9.4	40.9	15.9	
9.5	13.8	38.0		9.3	23.2	51.3		8.5	48 7.3	53.2	A	7.8	31 34.3	54.2	A	9.5	17 26.5	54.4	
9.5	40.9	42.8		7.5	3 6.8	54.9	A	9.5	22.7	18.4		9.4	32 53.0	52.2		9.0	44.3	41.9	
9.5	48.7	27.5		9.0	36.3	27.4		9.5	47.0	44.2		8.8	33 36.7	42.9		9.5	46.7	55.2	B
9.5	21 23.3	41.9		9.5	5 40.2	49.3		9.5	49 59.8	47.8		8.9	51.5	57.2	A	8.2	20 32.8	43.3	B

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	8h	+51°			8h—9h	+51°			9h—10h	+51°			10h	+51°			10h—11h	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	7 27.6	51.8		8.6	47 31.6	42.4		9.0	21 33.7	2.8	A	9.5	1 55.0	42.7		9.2	50 22.1	48.7	
9.1	34.7	54.6	A	8.7	33.1	59.2		9.5	22 51.0	21.1		9.4	3 46.2	49.7		9.0	36.8	46.2	
9.5	56.3	6.6		9.5	54.2	10.7		9.1	25 56.2	8.7	A	9.1	46.7	1.2	A	7.6	51 14.9	41.1	B
8.8	8 42.2	47.7	A	9.0	48 30.3	23.6		9.4	26 17.5	44.8	A	9.0	4 0.8	31.9	A	9.4	22.5	0.8	
9.3	52.5	46.1		8.5	49 3.7	43.9	A	9.4	52.1	15.1	A	6.5	28.4	12.7	A	9.3	53 7.0	46.3	
9.0	55.7	34.4	A	9.0	41.8	43.4	A	9.5	27 2.5	13.7		8.5	35.9	0.7	A	9.3	54 27.6	1.0	A
8.0	9 10.7	43.2	A	9.5	50 20.2	12.2		9.5	34.7	47.8		9.5	5 38.8	19.6		9.4	56 7.4	45.1	
9.0	32.0	28.9	A	8.5	25.6	29.0	A	9.5	35.2	39.9		9.4	45.3	47.1		8.5	57 24.3	36.5	A
8.7	34.2	46.2	A	9.5	42.7	22.6		8.9	49.8	22.0	A	8.6	6 39.6	29.9	A	9.5	58 51.5	55.0	
9.4	10 33.2	43.3	A	9.5	58.5	1.4		9.5	29 4.8	25.5		8.2	42.7	3.6	A	9.4	59 18.8	18.9	B
9.5	35.8	56.7		9.5	51 19.6	28.6		9.5	26.2	43.4		9.2	11 6.8	51.2	A	9.5	1 54.0	43.7	
9.5	11 59.2	16.0		9.5	43.2	48.2		9.5	30 52.9	53.8		9.3	8.6	3.1		9.4	3 35.4	50.1	
9.0	12 16.2	24.5	A	9.4	46.8	41.4		8.9	31 31.2	33.5		9.2	57.5	16.0	A	9.0	50.8	52.6	A
9.5	44.3	12.6		9.5	52 30.0	57.4		9.0	54.3	34.4		9.0	12 11.0	5.7	A	9.2	4 12.8	51.1	A
8.7	49.1	41.1	A	9.3	57.2	58.7	B	9.1	32 5.2	13.9		9.5	45.0	11.7		9.0	46.4	25.8	A
8.5	50.4	7.6	A	9.5	53 27.8	20.6		7.5	56.1	55.6	B	9.5	56.1	41.8		8.8	5 21.6	58.9	A
9.4	59.2	56.8		9.2	54 49.3	15.7		8.0	33 10.5	14.8	B	8.0	13 21.9	13.6	A	9.4	7 42.1	1.2	
9.3	14 52.4	33.9	A	6.8	55 5.1	23.9	B	9.5	36.0	18.0	B	9.5	14 38.3	51.2		9.0	43.4	25.8	A
9.5	15 39.1	59.4		9.1	15.7	35.0		9.5	34 2.0	15.8		9.4	15 39.6	54.6	B	8.7	8 59.3	57.2	A
9.5	54.3	15.0		9.4	56 5.1	32.9	A	9.2	36 8.8	31.4		9.5	17 2.5	32.9		9.0	9 21.4	3.2	
8.3	17 1.5	34.0		9.4	7.2	44.4		9.5	22.0	58.8		8.9	24.5	48.2	A	9.5	10 24.5	33.3	
8.0	5.3	21.5	L	8.5	25.6	12.7	A	9.4	37 33.8	36.4		9.5	32.1	45.2		9.0	13 49.9	29.3	A
9.3	14.0	58.3		9.5	57 44.8	29.0		8.5	55.1	37.4	B	9.5	56.6	16.1		7.5	17 10.8	17.5	A
9.2	18 54.6	48.6	A	9.2	58 32.8	53.0		9.4	38 23.8	25.5		6.6	21 10.5	44.7	G	9.3	18 7.1	9.0	B
9.5	56.4	24.6	B	8.0	45.3	22.6	A	9.1	39 11.7	33.4	A	6.2	15.0	18.7	A	9.5	30.1	10.0	
9.0	59.0	48.9	A	9.3	0 24.7	37.6	A	9.5	26.5	24.5		9.0	24 57.1	30.4	A	9.4	39.7	13.4	
8.5	19 4.5	39.6	A	9.1	54.3	53.6	A	9.2	47.2	17.6	A	9.2	25 5.6	8.5	A	9.4	21 0.1	31.5	B
8.4	7.0	7.4	A	6.5	1 48.7	2.8	A	9.2	53.8	56.2		9.4	21.0	0.8		8.7	8.4	3.6	A
9.5	11.2	15.8		9.0	4 27.6	2.8		8.8	40 23.9	47.8	A	9.3	31.3	48.7		9.5	24.9	37.7	
7.8	21 7.5	11.4	A	9.3	57.2	45.3		9.0	28.4	36.4	A	9.3	39.2	4.8	B	9.0	40.8	0.1	A
7.5	21.0	6.4	A	9.4	5 15.8	19.1		9.0	41 27.7	41.9	A	8.8	27 58.5	24.2	A	9.5	44.9	44.7	
9.4	51.4	59.3	A	8.6	6 2.1	16.1	A	9.2	34.2	48.8		8.8	59.3	27.4	A	9.3	22 49.5	20.4	
8.8	22 9.6	15.3	A	9.0	59.8	54.9		7.0	43 41.3	18.6	A	9.4	28 19.7	14.6		9.3	58.4	14.5	
8.6	18.3	7.8	A	8.5	9 52.7	4.7		8.9	44 19.7	23.5	A	9.5	21.5	29.5		9.5	24 12.8	10.0	
9.1	23.3	53.4	A	6.5	10 38.4	53.3	A	8.2	31.7	12.7	A	8.4	23.0	19.5	A	9.1	25 23.4	32.3	
9.3	27.1	58.8		8.2	58.7	54.6	A	9.5	45 26.9	59.7	B	9.5	54.2	23.0		9.4	26 1.8	59.6	
8.8	52.6	30.1	A	9.5	11 46.2	37.6		8.4	46 22.0	53.0	A	9.2	30 6.1	50.7		7.3	29 15.4	57.3	A
9.2	24 27.1	10.4	B	neb	58.2	35.1		9.3	46.1	29.7		9.2	31 4.8	53.3		9.4	42.5	31.8	
8.8	28 4.9	58.9	B	8.3	12 25.7	37.4	A	9.5	48 29.8	39.4		9.3	32 48.1	40.3		6.0	30 1.9	25.9	A
8.7	15.3	9.9	A	8.4	37.7	13.2	A	9.0	49 25.0	21.0		9.5	54.5	51.7		9.5	10.0	11.0	B
9.5	26.1	0.0		9.1	13 9.2	23.5	A	8.5	40.0	40.8		6.5	34 4.4	33.8	A	9.5	31 49.9	24.4	
8.5	30.2	58.9	B	9.5	20.2	13.7		9.5	50 47.7	58.8		9.5	36 34.0	22.0		9.5	32 7.8	12.0	
7.0	30 7.9	56.1	F	9.4	25.4	50.5		8.3	49.3	55.8	B	9.5	37 29.5	30.9		9.2	35 20.9	13.0	
9.3	19.2	19.2		9.4	38.0	55.7	B	8.6	51.3	18.5	B	9.0	38 25.0	23.4	A	9.0	29.8	24.4	
9.3	31 4.7	16.1		9.2	56.7	33.5		9.5	52 5.0	55.6		8.0	40 7.6	22.9	A	9.1	45.8	31.8	
8.8	47.1	10.2	A	9.0	14 43.2	48.3		7.5	26.3	11.6	F	9.4	41 32.9	6.1	B	9.5	36 14.4	43.7	
9.1	33 5.5	53.9	A	8.5	43.3	31.9		9.3	35.8	37.3		9.5	49.4	20.0		9.1	33.5	54.6	A
9.1	35 17.1	20.6	A	9.1	15 27.7	33.0		9.4	56.6	55.8		9.0	42 42.5	43.2		9.3	51.7	51.1	
9.1	23.6	25.4		9.5	28.3	45.2		9.3	53 25.0	30.4		8.3	54.8	1.7	A	9.5	37 16.9	57.3	
9.1	52.7	29.5		9.3	44.7	9.7	A	9.4	54 26.5	28.9		9.2	43 22.5	23.0		9.3	39.6	54.1	
8.7	57.5	50.7	A	9.4	16 16.7	58.2	A	9.3	55 37.1	30.4	B	8.9	25.0	53.6		9.4	52.9	51.1	
8.8	37 48.7	42.9	A	9.5	53.2	43.4		7.0	50.5	14.6	A	6.2	32.4	1.8	A	9.1	59.8	37.3	A
9.2	38 34.4	39.4	A	9.5	17 6.3	59.2		7.5	56 23.4	38.8	A	9.2	44 32.0	9.7		7.3	38 25.9	21.9	A
8.1	58.7	13.2	A	9.5	9.7	29.0		9.5	58 26.0	38.9		8.9	33.8	47.2	B	8.9	46.0	24.8	A
9.5	39 47.8	13.7		9.5	19.9	22.5		9.5	30.5	8.7		9.4	45 28.6	6.1		9.3	56.0	57.9	B
9.1	40 54.7	31.0		9.3	18 31.4	58.8		9.5	59 3.5	34.8		8.2	46 37.8	41.2	B	9.3	39 3.5	43.2	
9.4	43 23.6	23.5		9.5	19 3.2	48.9		7.1	48.4	32.9	A	9.5	47 50.4	19.1		9.3	20.0	47.1	
8.9	44 4.8	46.8		9.5	5.7	21.6		9.2	0 19.1	45.4		9.5	48 23.5	17.9	B	9.3	31.9	35.3	A
9.5	45 7.3	5.2		9.5	20 12.8	12.7		9.1	31.7	43.4	B	9.3	33.0	3.1		9.5	58.2	58.5	
7.2	46 51.6	17.6	B	9.5	14.7	40.9		9.5	1 2.0	20.5		9.0	49 28.7	29.4		9.5	40 37.6	44.7	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	11h—12h	+51°			12h—13h	+51°			13h	+51°			13h—14h	+51°			14h—15h	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	41 26.8	24.9		9.0	21 58.6	7.3	A	8.4	7 8.3	53.9		8.0	50 2.9	55.8	A	9.4	34 30.3	2.6	
9.5	35.0	40.7		7.9	23 48.1	47.0	B	9.5	25.4	38.5		8.9	48.0	9.9	A	8.1	41.7	37.9	B
9.5	42 6.9	51.6		9.5	25 48.3	19.2		9.5	8 3.4	42.7	B	8.3	51 38.7	14.9	A	8.9	35 37.8	35.4	
9.5	19.5	28.8		8.6	26 17.3	53.8	A	8.0	9 19.8	35.5	A	8.6	53 52.2	26.8	A	9.1	36 28.0	57.7	
9.1	43 47.7	20.4		9.3	40.8	23.5		9.5	50.5	59.2		8.6	58.0	12.9	A	8.6	39 1.8	13.8	B
9.0	44 18.8	2.2	A	9.5	27 50.4	23.5		8.3	10 26.8	20.6	A	9.5	54 5.3	45.3		9.5	24.7	57.1	
9.0	32.4	25.3	A	9.5	28 30.3	42.4		9.3	11 48.9	15.2		9.5	55 41.0	56.7		9.4	29.8	52.4	
9.5	45 8.0	27.3		9.4	30 51.0	3.2	A	9.1	50.8	20.7		9.3	56 10.7	1.5		9.3	39.5	2.8	B
9.5	27.5	41.2		9.1	31 12.5	47.8		7.8	56.7	12.7	A	6.0	57 37.5	40.8	A	9.1	40 34.9	36.3	
9.2	46 42.8	21.4		9.2	43.7	38.4	B	8.5	13 41.9	12.3	A	9.5	0 52.6	11.8	B	9.5	44.9	46.7	
9.5	47 44.1	31.8		8.4	49.8	53.4	A	9.5	48.4	23.5		9.5	3 19.6	57.2		7.0	41 40.3	0.0	A
9.4	46.5	9.0		8.4	51.1	40.2	A	8.7	14 16.7	11.8	A	8.3	31.4	18.9		9.0	42 18.8	24.8	
8.0	54.9	49.1	A	9.4	32 48.3	44.8		9.5	17.2	59.7		9.5	40.8	46.1		9.5	29.4	23.8	
9.0	49 11.4	25.4	A	9.2	58.5	47.3	A	9.5	15 19.4	36.3		9.4	5 2.0	46.4	B	8.5	53.3	2.4	A
9.5	51.9	48.1		9.5	33 54.2	20.1		9.5	16 31.0	44.9		9.3	6 13.8	17.9		9.3	43 20.7	51.2	
9.5	50 14.0	23.9		9.3	34 21.3	18.6		9.5	17 2.4	37.5		9.5	34.2	36.3		8.9	34.2	51.9	B
9.4	52 7.7	14.1		8.8	34.8	13.2	A	8.6	14.9	9.8	A	9.5	7 25.2	2.0		6.3	44 50.7	58.9	S
9.0	19.9	51.6	A	8.7	35.5	1.9	A	9.0	23.5	50.0	A	8.8	36.8	3.4	A	8.8	45 54.7	54.7	
9.5	53 44.9	31.3		9.5	35 13.3	55.0	B	8.7	18 40.4	54.2	A	7.5	40.8	24.3		9.4	46 13.0	11.4	
9.4	55 3.0	49.1		9.3	37 44.9	50.0		8.8	54.6	53.4	A	8.3	8 26.5	58.3	A	9.5	23.8	14.4	
9.2	56 19.8	26.8		9.3	38 45.3	20.1		9.0	20 8.2	22.1	A	9.0	9 23.3	26.4		9.3	26.4	55.4	
9.5	57 7.0	52.3	B	9.2	39 10.3	39.9		9.4	11.3	38.7	B	8.3	10 2.8	44.9		9.2	47 0.7	49.5	
9.0	7.4	2.2	A	9.5	40 9.4	40.4		9.3	48.6	28.1	B	7.5	11.3	7.4	S	9.5	50.4	11.4	
9.5	11.2	9.5		9.3	28.8	51.3		9.5	21 4.1	58.6		8.2	29.7	40.3		9.5	48 0.2	42.7	
8.2	35.2	5.6	A	9.3	42 30.2	42.3		8.8	22 1.4	11.8	A	8.9	49.3	47.2		8.8	21.3	13.9	
8.2	58 32.1	6.5	A	9.5	55.7	41.4		7.5	15.9	19.7	A	8.0	11 7.8	11.9		9.2	24.7	51.5	
9.5	0 24.0	20.5		9.5	43 56.4	39.9		6.7	47.8	28.5	A	8.5	53.2	40.3		9.5	46.3	14.9	
9.0	1 32.6	12.1	A	9.2	44 9.8	9.4	B	9.2	25 2.4	22.6	A	6.8	12 12.3	58.8	A	8.8	50 0.3	13.4	
9.5	33.5	53.9		9.0	12.7	35.0	A	9.2	43.3	31.0		9.4	13 44.0	57.5	B	9.4	52 38.9	35.3	
9.5	49.1	1.8	B	9.0	15.3	16.6		9.5	27 12.4	1.9		9.0	14 19.8	58.1	A	8.1	50.7	26.2	B
9.4	2 7.2	50.1	B	9.5	45 8.8	33.5		8.3	34.5	53.5	A	9.5	16 7.1	15.9		9.0	53 28.7	30.8	
9.4	3 24.3	16.1		8.0	45.7	4.3	B	8.1	57.4	41.5	A	9.5	33.6	28.9		7.3	55 55.8	8.9	A
7.8	32.6	21.0	R	9.2	46 8.4	50.8		9.5	29 24.3	28.6		8.2	55.5	47.2	A	7.9	59.9	22.9	B
7.9	4 24.8	38.7	B	8.8	14.4	59.5	B	9.5	30 20.4	51.9		9.3	17 26.0	57.4	A	9.5	56 27.2	56.1	
9.0	40.9	51.2		9.5	47 48.2	1.8		9.4	31 48.9	11.8		9.5	18 24.2	13.0		8.9	57 23.3	13.8	A
9.5	5 18.1	17.7		9.5	48 22.0	57.5		6.5	54.1	26.6	S	7.9	19 59.4	35.9	B	9.3	53.7	1.0	
9.2	18.1	12.2		8.9	50 1.6	52.0		9.2	32 3.4	48.3	A	9.0	20 8.5	46.2		9.4	0 22.0	55.2	
8.4	24.2	5.2	B	9.3	22.8	35.0		8.0	15.5	42.0	A	9.5	22.6	42.3		9.2	1 40.6	58.9	B
9.2	8 3.0	27.5		9.3	59.4	36.4		7.0	34 27.9	15.7	A	9.2	21 42.1	24.8		9.0	2 59.7	28.8	
9.4	11 17.3	26.4	A	9.5	52 45.8	29.5		8.7	56.9	33.0	A	9.0	43.4	23.5	B	9.0	3 40.6	13.9	
9.5	42.0	48.7		9.3	54 33.5	47.3		9.3	35 44.3	38.0		8.4	51.3	3.5		7.9	4 35.9	35.1	B
9.2	47.9	58.2	A	7.4	56 30.8	48.3	A	9.0	36 12.4	39.0	A	9.5	22 0.8	53.1		9.4	38.6	45.3	
9.5	12 20.8	11.2		8.4	58.4	4.3		9.3	37 34.0	18.6	B	9.5	23 19.3	22.4		8.9	46.5	40.8	
9.4	13 7.2	23.3		9.2	57 31.0	47.8		9.2	38 9.9	0.9		9.5	25 19.9	34.3		9.5	5 30.2	40.3	B
9.5	29.4	19.2		9.5	58 16.2	39.0		9.0	22.4	56.1		9.5	48.8	26.5	B	9.5	6 39.7	22.0	
9.4	14 10.8	47.3		9.3	21.5	18.2		9.2	31.3	0.9		9.5	26 1.3	55.7		9.5	45.3	43.4	
9.5	24.6	2.3	A	7.8	24.6	58.2	A	9.1	40 50.9	14.2	A	8.4	49.6	33.3	A	9.0	45.3	16.1	
9.5	49.0	29.5		8.8	59 8.3	46.8	A	9.0	41 29.9	31.0		7.8	52.2	40.3	A	9.5	7 33.9	1.1	
9.4	15 12.1	18.1		9.2	12.6	57.9		9.5	44 2.9	12.9		8.4	27 33.8	27.9		9.4	10 22.3	19.9	B
9.5	16 7.3	40.9		9.5	0 28.5	8.8		8.3	34.8	4.5		9.0	28 41.8	34.8		6.3	11 25.3	28.6	B
9.5	51.4	20.7		9.0	41.8	40.9		9.5	45 13.2	46.3		9.1	42.0	14.5		9.4	31.5	3.8	
9.2	57.5	58.5		9.3	1 15.3	40.9		9.0	30.7	28.3		8.8	29 45.1	17.8		8.7	33.1	28.2	B
9.4	19 28.0	30.2	B	9.2	43.4	7.3		9.5	46 0.8	21.4		9.5	30 5.7	50.9		8.9	15 5.0	57.7	A
7.3	51.1	59.5	A	9.3	47.8	17.2		7.9	21.3	51.9	A	8.7	11.4	37.7	A	9.5	50.1	38.9	
9.2	52.8	2.3	A	9.0	50.4	40.9		9.5	33.8	54.4		9.0	56.3	9.6		9.4	16 36.4	17.6	B
9.5	20 7.3	18.1		9.5	2 18.5	35.5		8.5	47.2	2.9	A	8.7	58.4	30.5	A	9.4	40.9	15.9	
9.5	13.8	38.0		9.3	23.2	51.3		8.5	48 7.3	53.2	A	7.8	31 34.3	54.2	A	9.5	17 26.5	54.4	
9.5	40.9	42.8		7.5	3 6.8	54.9	A	9.5	22.7	18.4		9.4	32 53.0	52.2		9.0	44.3	41.9	
9.5	48.7	27.5		9.0	36.3	27.4		9.5	47.0	44.2		8.8	33 36.7	42.9		9.5	46.7	55.2	B
9.5	21 23.3	41.9		9.5	5 40.2	49.3		9.5	49 59.8	47.8		8.9	51.5	57.2	A	8.2	20 32.8	43.3	B

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	15ᵐ—16ᵐ		+51°		16ᵐ		+51°		16ᵐ—17ᵐ		+51°		17ᵐ		+51°		17ᵐ		+51°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.4	20	53.1	5.9	8.0	5	11.2	7.1	9.2	33	0.2	51.2	9.5	6	37.2	24.8	8.8	37	20.3	41.4
9.5		55.5	58.3	9.5	6	10.7	19.1	8.0		39.9	37.7	8.9		46.3	24.5	7.9		59.5	32.6
7.0	21	11.9	6.0	9.4	7	15.1	17.8	9.5	34	41.3	1.9	9.5		49.2	23.3	6.0	38	4.1	53.3
9.4		15.5	13.5	9.5		15.3	33.0	9.5	35	2.4	23.8	9.5	7	1.4	23.5	9.4		23.8	7.1
9.2		29.3	25.0	9.0		19.3	12.0	7.0		19.0	6.4	9.0		24.4	37.5	9.4		23.8	29.0
8.9		45.3	52.4	9.3	9	25.8	9.2	8.9		23.0	21.3	8.4		25.4	29.5	9.0	39	13.5	40.7
9.1	22	25.8	9.1	9.4	11	6.0	49.4	9.3	36	47.7	9.9	7.2		54.0	55.7	8.5		14.8	20.0
9.5		41.2	29.3	9.5		57.6	22.5	9.3	38	37.5	29.1	8.8	8	3.1	33.1	8.4		19.5	41.4
6.8		53.3	6.6	8.8	12	34.1	57.4	9.3		42.4	4.4	9.5		28.0	37.5	9.5		56.3	24.5
9.3	23	48.2	4.1	9.2		45.7	45.0	7.3	40	10.9	48.7	9.2		45.9	54.0	7.8	40	56.3	50.7
9.4	24	48.5	8.9	9.5	13	51.2	32.3	9.5	41	0.7	22.6	9.5	9	15.5	37.5	8.8	41	27.8	58.3
9.1		53.5	23.6	9.3	14	20.0	21.5	8.5		13.9	4.4	9.5	10	37.0	1.6	8.4		51.8	51.4
8.2	25	22.8	1.1	9.0		49.9	40.5	8.3		19.6	40.2	9.5		40.7	29.5	9.5	42	17.9	16.5
9.0	26	36.6	30.5	9.0	15	21.1	12.1	9.3	43	40.0	56.6	9.4	11	41.0	46.9	9.4		50.5	52.0
9.4	30	8.5	59.3	9.3		46.4	10.6	9.3		40.2	29.3	9.3		45.9	58.7	9.0	43	9.4	26.5
9.0	33	20.3	43.4	8.4		57.7	58.1	9.5	45	0.5	56.0	7.9	12	33.9	58.7	9.5	44	2.6	16.3
9.5	34	14.3	47.9	8.9		57.9	54.7	9.2		34.9	25.3	9.1	14	9.6	55.7	9.5		26.2	12.8
9.5	36	12.0	41.0	9.4	16	35.2	55.9	9.5	46	11.7	8.9	9.4		40.4	49.4	9.1		50.1	38.1
9.5	38	11.5	18.3	9.4		53.7	26.7	9.5		16.3	31.2	8.0	15	10.0	4.6	9.4	45	2.5	58.7
9.5		15.8	1.4	9.5	17	16.9	7.1	9.5	47	18.8	49.7	9.2		36.1	48.9	8.6		9.2	45.4
9.2		18.2	37.0	9.5		21.7	26.5	7.9		20.7	22.8	8.0	16	46.9	49.4	8.9		40.7	30.9
9.4		42.9	2.4	8.0		24.5	51.4	7.7		45.3	1.9	9.5	17	3.7	40.4	9.2	46	33.9	6.0
8.5	39	4.3	53.7	8.4		27.1	40.5	9.5	48	9.8	17.3	9.0	18	36.9	33.0	9.2		52.3	25.0
9.1		23.1	32.6	8.4		35.2	15.1	8.9	49	40.2	22.3	8.7		53.8	0.7	9.5	47	6.1	30.9
8.4	40	2.3	22.0	9.5	18	0.8	19.1	8.0	50	22.2	15.4	9.5	19	35.0	31.8	7.5		13.5	17.0
9.3		35.7	12.7	9.3		33.2	19.1	8.3		43.0	34.3	8.3		48.6	41.4	9.0		45.3	15.5
9.2		44.8	52.4	9.5		46.7	4.1	9.5		45.7	44.2	9.5	20	30.0	57.3	9.2	48	10.7	4.4
9.0	41	35.0	8.7	8.4	19	2.4	6.2	9.5	51	22.4	38.2	8.8	21	46.7	11.1	7.9		13.8	9.3
9.3		52.5	20.6	9.1		9.1	10.6	9.5		38.2	27.8	9.5		51.5	42.9	9.3		23.1	1.9
8.3	42	21.5	14.3	9.3		13.6	39.0	9.5		38.5	56.2	8.1	22	5.2	37.3	9.5		42.6	58.0
9.3		22.2	56.1	9.2		16.8	3.7	9.5		57.2	13.3	9.5		21.4	49.4	9.3		46.3	32.4
7.8	44	7.8	24.1	9.3		28.2	12.6	9.4	52	0.7	54.1	9.3	23	11.6	46.1	9.5	49	1.4	59.0
9.5		27.0	25.6	9.3		51.8	13.1	9.5		23.0	2.6	9.5		37.1	50.7	8.4	50	2.8	38.4
8.0	46	10.5	19.2	9.0		53.2	44.5	8.7		24.4	20.5	9.5		39.2	55.4	9.0		13.9	57.7
9.4	47	8.7	13.7	9.5	20	12.2	33.0	8.9		44.2	54.7	9.5	24	11.0	4.6	9.5		45.1	31.8
8.2		12.0	16.2	9.3		43.3	8.6	8.5		59.3	41.1	9.5		37.2	57.6	9.4	51	3.3	51.4
9.5		49.6	57.9	7.0	21	49.6	28.1	9.0	53	34.7	12.6	9.1		44.3	42.9	9.5		4.5	45.7
8.5	49	31.9	52.8	9.3	22	8.7	38.5	9.5	55	47.7	7.6	7.5	25	11.5	28.0	9.2		26.0	12.0
9.5	50	33.1	48.5	9.5		18.5	13.1	9.5	56	45.5	1.6	7.3		37.0	35.5	9.1		41.6	5.0
9.4	51	19.4	40.1	9.4		34.4	6.7	9.4	57	17.2	53.0	9.1		37.0	52.9	9.0		44.0	28.7
9.1	52	11.1	17.6	9.4		34.6	1.4	7.3	59	5.7	7.1	9.1		38.0	51.4	8.2		49.5	31.2
9.5	54	13.2	51.7	9.2		39.9	43.9	9.1		12.5	24.5	9.1	26	8.5	11.6	2.2	53	15.4	31.5
8.8		24.1	7.2	9.1	23	37.1	23.6	9.1		13.3	36.4	9.5		38.4	56.0	8.6		59.8	11.7
9.3		39.0	7.6	9.0	24	9.9	32.5	8.3	0	14.2	27.0	9.1	27	11.3	1.0	9.1	54	25.0	29.8
9.2		44.5	14.6	7.3		22.1	54.1	9.5	1	7.0	56.4	9.3	29	3.7	52.5	9.2		32.5	56.5
7.8	55	5.2	4.1	6.2	25	1.2	45.4	9.5		56.5	49.9	9.3		7.7	44.8	8.7		47.9	59.6
9.5		13.6	5.9	7.7		21.0	5.4	9.4	2	17.1	34.3	9.5	30	11.6	28.5	9.5		51.5	11.4
8.1		56.3	12.1	9.5	26	16.9	11.2	9.4		35.0	51.2	9.5	31	8.0	50.6	9.5		53.5	20.3
9.0		59.7	34.8	9.3		29.5	54.4	8.8		42.5	6.1	9.5		16.3	13.5	8.8	55	47.6	13.1
8.0	56	36.6	14.1	9.5	27	2.3	46.5	9.3		43.2	21.5	9.3		24.1	26.4	8.5		53.2	54.7
8.3	57	54.7	45.4	9.2		7.9	24.2	9.3		44.7	39.4	9.4	32	8.3	44.4	8.5	56	8.5	50.9
9.5	59	1.9	35.5	8.0		33.6	26.5	9.5	3	3.6	39.3	9.2		17.5	36.9	9.5		18.9	39.3
9.4		20.2	5.2	9.1		34.4	53.1	8.6		8.2	44.4	7.9	33	13.8	11.6	9.5		19.6	43.2
9.5		24.4	22.5	8.8	30	7.3	49.0	8.8		29.0	5.1	7.5		18.9	5.3	9.0		23.4	12.4
9.3	0	20.9	50.0	7.5		23.8	16.1	9.5	4	2.5	38.0	9.3		35.5	15.4	9.5		40.3	19.7
9.0		42.0	52.1	9.5		23.9	24.0	9.1		25.0	7.6	8.8		40.1	46.1	9.3	57	3.8	0.9
9.1		45.7	46.0	9.0	31	20.0	11.6	9.5		30.0	51.3	8.8	34	28.8	27.0	9.3		30.0	3.2
8.8	4	8.2	6.2	9.0		43.7	33.5	6.5		43.9	1.7	9.5	35	13.0	18.5	9.5		36.9	24.8
8.5		39.1	33.0	9.3	32	15.1	55.1	9.5	5	42.0	24.5	9.5		36.4	57.0	9.0		37.5	14.4
8.5		53.9	14.6	9.5		28.8	3.6	9.5	6	18.9	32.0	8.3		38.0	47.4	8.9	58	39.8	10.7

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	17ᵘ—18ᵘ	+51°			18ᵘ	+51°			18ᵘ	+51°			18ᵘ—19ᵘ	+51°			19ᵘ	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.4	58 52.4	26.9	A	9.5	18 1.7	51.6		9.0	41 25.8	9.5		8.8	57 41.0	0.7		8.2	12 50.3	9.1	B
7.0	56.8	38.3	A	6.8	6.4	12.8	A	9.5	42.1	50.6		9.2	48.4	49.0	B	9.1	57.4	14.7	
9.1	0 13.4	10.9		9.0	22.3	32.7		9.5	42 3.6	51.2		9.5	58 0.5	56.3		9.1	13 16.3	12.7	
8.8	58.2	34.7	B	9.5	31.9	16.4		8.8	43 8.3	32.5		9.4	6.8	15.9		8.8	22.9	58.5	
9.5	1 12.3	24.4		6.8	49.8	28.3	A	9.5	34.1	44.3		9.5	12.0	17.5		9.4	32.5	12.8	
8.2	26.5	51.6	A	9.4	19 18.5	9.2		9.3	59.8	37.8		9.1	59.7	29.1		9.4	42.8	51.8	
9.4	39.1	55.8		9.5	33.2	11.3		9.5	44 10.6	53.0		9.4	59 21.8	37.6		9.4	45.6	25.2	
6.7	2 13.3	55.9	A	9.5	36.2	53.2		9.5	40.1	6.8		8.2	27.6	22.8	S	7.4	55.8	5.0	B
9.5	41.9	14.9		8.9	44.4	24.4	A	9.5	49.3	41.8		8.4	47.8	18.0	L	9.5	14 20.4	56.3	
9.3	48.2	27.4		9.4	46.1	28.3		8.5	52.9	31.5		9.4	0 2.1	26.5	B	9.4	41.0	26.0	
9.5	3 58.7	27.8		9.5	20 19.8	28.7		9.5	45 10.0	8.4		9.5	5.7	44.1		8.9	54.1	44.4	
7.7	4 29.3	59.9	A	8.0	23.6	33.3	A	9.2	14.3	23.1		9.0	28.6	37.2		8.0	15 10.1	59.1	L
9.5	5 7.4	30.8		9.5	30.5	33.4		9.5	24.0	43.9		9.2	51.0	52.7		9.0	23.6	18.2	
9.5	11.9	50.2		9.4	51.4	32.7		9.4	39.8	31.5		9.4	52.1	4.3		9.3	16 1.8	15.0	
8.6	34.0	10.2		8.5	52.1	26.3	A	9.5	41.5	38.6		9.5	1 36.7	49.8		8.7	10.8	3.9	
8.6	43.3	20.3	R	9.5	21 22.2	22.8		9.5	57.9	9.5		9.5	46.6	1.3		8.7	12.1	39.3	
9.1	6 3.5	42.0		8.8	41.6	31.2	A	8.7	46 53.1	10.0		9.2	58.6	50.9		8.8	19.1	14.2	B
8.5	15.2	11.9		9.4	22 19.2	17.9		8.0	47 8.5	42.1	L	9.5	59.8	3.6		9.0	19.7	49.9	
8.3	15.8	50.6	A	9.1	26.8	2.5	R	9.2	40.2	16.5		9.2	2 5.1	19.3		8.7	36.1	29.8	
9.5	34.4	37.8		9.2	37.1	56.1		8.5	58.4	39.1	F	9.5	9.3	45.2		9.5	50.2	58.7	
9.5	34.8	12.9		8.7	54.4	54.8	A	8.7	48 8.5	5.8		9.0	22.1	50.2	A	9.5	52.6	1.3	
9.1	34.8	48.6		8.4	23 13.8	53.5	A	9.3	21.9	50.0		9.2	32.4	0.9		9.1	17 14.0	11.9	
7.5	55.9	52.9	A	9.5	33.9	42.3		9.4	29.1	37.9		9.3	39.0	25.6		9.5	39.4	45.5	
9.5	57.6	2.9		9.2	48.4	5.2		8.5	39.0	9.4	S	9.5	52.4	52.0		9.3	53.3	24.9	B
9.3	7 15.2	42.6		9.4	50.3	18.7		9.5	45.9	4.3		9.1	3 24.4	2.4		9.5	53.7	4.2	
8.5	25.5	27.4	A	9.4	50.4	30.7		9.0	47.4	10.8		7.5	34.5	26.4	L	9.4	18 6.0	38.5	
9.2	30.8	37.8	B	8.4	24 2.6	4.9		8.2	57.2	52.8	A	7.7	46.9	8.9	P	9.4	9.9	23.9	
7.0	42.9	42.3	A	8.4	6.5	39.3		9.5	49 10.8	23.9		9.3	47.6	28.4		9.5	14.1	25.8	
9.5	8 17.2	40.3		7.9	10.6	32.7	A	8.9	11.6	23.5		9.2	48.2	33.3		9.5	17.3	21.8	
9.1	22.9	30.9	A	9.4	25 5.1	29.2		9.0	19.6	25.0		8.9	48.2	49.3	A	9.5	21.0	30.9	
8.6	33.3	7.6	A	9.2	7.2	52.5		9.5	50 4.4	27.8		9.5	4 4.0	45.4		9.4	39.1	29.9	
9.0	9 14.8	56.2	A	7.6	22.5	50.6	A	9.0	14.7	18.4		7.5	23.9	52.9	A	7.6	46.0	50.7	L
9.0	52.4	45.8		9.5	36.4	13.9		9.4	16.3	30.7		9.5	53.2	0.9		9.2	20 3.8	10.0	
9.2	10 9.3	17.4		8.5	27 11.1	17.9		9.4	22.2	29.7	B	9.4	5 1.5	4.1		9.5	15.8	5.7	
9.2	49.4	27.1	B	8.9	37.7	6.8	R	9.1	27.4	1.8		9.2	5.7	53.9	A	9.4	16.7	23.2	
9.5	54.8	46.3		9.5	52.6	43.7		8.9	55.1	42.4	A	9.1	20.8	53.9	A	9.4	32.9	30.3	
9.5	57.6	4.7		9.5	28 2.0	7.2		9.5	51 6.8	21.3		9.3	57.0	16.8		9.5	37.4	25.0	
9.3	11 19.9	11.9		9.2	8.8	23.5		9.5	19.2	52.4		9.0	6 23.2	10.1		9.4	47.7	27.9	
9.0	55.2	8.2		9.1	23.7	4.5		7.9	23.1	7.2	A	9.2	26.2	6.9		9.5	55.0	33.9	
7.7	12 19.3	33.8	L	9.3	29 9.4	29.3		9.5	52 11.5	1.2		9.3	32.1	29.8		9.3	21 18.6	33.3	
9.5	20.9	44.0	B	9.0	30 0.8	43.7		9.5	37.1	5.4		9.3	41.0	4.5		9.5	24.5	26.7	
8.5	48.7	15.5	S	8.2	31.0	37.1	A	9.3	50.6	3.8		9.2	43.1	26.6		9.3	40.4	12.7	
9.5	13 22.9	48.7		9.1	57.5	33.1		7.7	53 32.1	18.4	A	9.5	7 18.9	55.4		9.3	42.7	17.0	
7.6	24.7	10.2	L	6.9	31 10.5	40.8	A	7.3	37.0	31.5	A	8.7	23.8	43.3		9.1	22 30.5	8.4	
9.5	32.7	56.5		9.4	17.7	10.7		9.5	53.3	45.6		8.0	24.7	7.3	A	9.5	38.6	50.1	
9.5	38.8	30.4		8.5	32 2.8	5.8	A	9.4	54 29.8	48.4		9.5	32.5	35.7		9.4	51.4	31.8	
8.8	44.8	23.8	R	9.5	47.4	16.4		9.5	37.1	37.3		7.3	43.1	47.2	L	9.5	57.0	23.9	
9.2	14 24.0	23.8		8.0	33 9.1	45.8	A	9.5	56.0	16.6		9.3	8 9.8	46.0		9.0	59.6	8.0	
9.5	32.3	10.4		9.4	34 12.5	32.4		9.4	55 5.8	14.0	B	9.5	29.5	8.6		9.5	23 24.3	1.7	
8.5	15 9.4	29.4		7.7	19.2	49.2	A	9.5	7.0	16.5		9.3	33.0	40.6		9.1	28.3	59.8	
8.8	27.1	27.3		9.1	36 1.3	31.4		8.4	8.1	58.5	L	9.5	52.5	0.3		9.1	33.1	52.4	
9.0	40.8	40.2		9.5	36.0	25.7		9.0	16.3	38.7	R	9.5	55.8	5.4		9.3	37.0	33.9	
9.5	58.6	10.4		9.3	37 55.8	57.2		9.1	56 19.7	9.8		9.5	56.8	6.0		9.4	50.9	14.3	
9.1	16 2.3	3.9	A	9.5	38 9.0	3.5		9.0	38.2	22.6		9.4	9 7.1	58.5		9.5	57.1	0.[illegible]	
9.5	9.5	28.7		9.5	39 47.4	55.9		9.5	40.8	56.7		9.5	34.6	10.5		9.2	24 39.2	5[illegible]	
9.2	13.9	42.0		9.0	40 6.5	29.3	R	9.5	44.3	54.0		9.2	55.1	53.9		9.5	40.3	4[illegible]	
6.2	33.7	16.4	A	8.9	8.8	16.4	R	9.1	55.1	5.3		9.2	58.1	52.6		8.2	52.4	[illegible]	
9.5	59.9	31.8	R	8.9	41 3.9	24.9		9.5	56.0	15.7		9.1	10 2.0	19.0		9.4	25 6.1		
9.5	17 17.4	9.4		8.5	22.7	51.8	A	8.8	57 28.5	7.3		8.8	29.7	9.0		9.4	16.4		
9.5	36.3	50.7		9.3	24.7	7.5		9.5	36.9	8.5		9.4	12 7.5	9.6		9.3	20.1		

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	19ᵐ	+51°			19ᵐ	+51°			19ᵐ—20ᵐ	+51°			20ᵐ	+51°			20ᵐ	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	25 21.1	46.3		8.9	37 57.1	31.6		9.1	54 44.7	41.8		7.8	5 29.8	15.0	A	9.2	16 3.4	5.1	A
9.4	40.7	21.9		9.2	38 16.0	40.7	A	9.3	54.8	18.8		7.9	31.9	50.6	A	9.3	7.5	59.6	
9.0	42.5	51.0		9.5	18.1	13.6		9.4	55.1	56.9		9.0	54.5	18.1	A	9.5	15.3	45.2	
9.1	44.6	17.5		8.7	20.1	40.8	A	9.1	55 12.7	53.7	J	9.4	6 4.8	56.4		9.5	21.7	59.4	
4.0	26 2.9	25.4	G	9.5	54.0	50.5		9.2	14.8	58.6		9.4	13.0	7.7		8.5	27.6	25.7	
9.5	36.2	48.9		9.3	58.9	15.1	B	8.6	15.6	36.3	J	9.2	32.5	22.8	R	9.5	17 3.2	2.6	
9.3	56.9	35.5		9.3	39 9.0	53.0		9.3	17.7	9.0		7.5	38.3	57.1	A	8.9	4.8	14.6	A
9.3	27 3.8	51.8		9.5	29.8	13.9		6.5	24.5	40.0	G	9.3	52.6	36.5		7.5	13.1	56.7	A
9.5	10.1	9.3		9.0	50.9	38.9	A	9.4	27.9	5.1		9.2	53.3	14.0		9.4	19.7	25.7	
9.5	17.0	4.2		9.4	53.2	37.0		9.1	29.3	5.6		8.7	58.5	43.7	A	8.1	38.8	46.8	A
9.5	18.5	1.7		9.3	40 8.5	7.0		9.2	56.0	1.3		9.5	7 24.8	2.3		9.4	51.7	40.4	
9.1	28 21.6	47.5		9.2	40.1	6.3		9.0	56.2	16.3	B	9.3	38.1	50.9		8.3	18 16.1	32.1	A
9.2	45.7	18.6		9.2	46.5	8.4		8.4	58.9	52.8	L	8.2	45.6	14.7	A	8.8	36.6	40.2	A
9.4	55.0	29.0		9.1	41 39.6	8.4		7.3	56 3.0	45.1	L	9.0	59.5	43.9	A	9.5	52.1	32.9	
9.3	29 1.1	10.0		9.0	42 7.4	13.0	A	9.4	15.2	44.7		8.7	8 19.2	51.1	A	8.5	58.8	6.0	A
9.4	4.2	5.5		9.4	9.6	47.5		9.5	38.3	36.8		6.1	29.8	2.0	A	9.4	19 24.2	39.1	B
9.4	4.6	11.9		9.5	13.9	17.9		9.0	44.4	33.0	B	9.3	58.0	58.3		9.5	38.9	35.6	
9.4	27.9	25.7	B	8.2	19.6	18.4	A	9.4	47.2	55.8		8.9	58.1	49.0	A	8.7	44.3	2.5	A
9.5	44.2	10.5		9.2	48.1	53.5		9.0	58.5	27.7		9.0	9 20.3	21.0	A	9.5	20 15.4	54.4	
8.6	50.7	43.4		9.5	43 5.1	33.6		9.3	57 1.0	16.5		8.3	22.6	24.7	A	9.0	55.8	55.8	A
7.8	30 4.8	48.5	B	8.8	44.1	42.4	A	9.5	29.4	13.0		7.7	23.0	3.4	A	9.1	21 0.4	19.2	A
8.7	33.2	30.8		9.3	44 1.0	6.9	B	9.0	35.2	41.1		9.5	59.8	41.7		9.4	3.9	5.6	
9.0	37.1	26.6		8.2	4.7	32.3	B	9.5	48.6	12.9		9.1	10 0.5	28.4	A	9.5	49.9	32.3	
9.4	38.0	3.0		9.2	24.0	45.7	A	9.3	58 5.0	20.1		9.4	45.3	30.0		9.4	22 3.8	11.4	
8.1	31 24.8	1.3	A	8.8	29.6	16.5		8.5	25.8	48.5		9.5	11 3.6	59.7		9.4	35.1	55.1	
9.2	45.7	58.4		9.4	51.2	57.8		9.5	32.2	26.5		9.2	24.0	39.0		9.5	56.5	44.3	
9.4	32 3.2	15.4		9.4	59.3	48.1		9.5	59 17.7	2.9		9.3	41.2	38.6		9.5	23 37.4	12.3	
8.4	22.3	45.5	L	8.9	45 7.7	40.9	A	9.4	21.5	24.9		9.5	45.9	6.2		8.8	24 12.2	12.3	
9.5	53.9	23.5		9.0	11.6	56.7	B	9.5	26.1	51.4		9.5	12 2.4	20.4		9.4	22.5	29.5	B
8.7	33 2.1	12.8	L	9.5	31.1	5.1		8.0	29.7	19.9	L	9.5	8.3	0.1		9.4	30.6	26.0	
9.2	7.4	49.6		9.5	58.2	48.4		9.5	40.5	39.0		9.5	8.5	53.0		9.5	34.0	52.1	
9.5	12.3	14.7		9.4	46 4.0	40.5	A	9.1	44.3	16.5		9.4	13.5	20.0	B	9.1	52.7	20.9	
9.5	13.4	20.7		9.4	11.1	3.4		9.4	52.7	42.4		7.5	15.0	33.1	L	9.1	55.4	17.0	
8.9	22.5	38.0		9.1	17.2	25.5		9.0	0 1.9	5.7	B	7.6	22.8	39.5	L	9.3	59.1	33.4	
9.5	25.5	10.4		9.5	18.5	42.8		9.3	13.1	4.5		8.9	28.8	42.2	R	9.5	25 19.0	35.9	
9.5	26.1	21.8		9.4	47 17.6	3.3		8.7	18.4	21.1	L	9.3	35.7	35.1		9.5	24.0	22.1	
9.4	34.8	32.9		9.1	20.5	35.3		9.4	21.1	4.8		9.0	36.4	2.9	B	9.5	26.0	50.5	
7.9	34.9	58.5	L	9.0	27.0	35.3		9.5	35.5	28.4		7.8	37.2	56.6	G	9.5	57.4	37.6	
9.1	55.0	42.2		9.3	28.0	21.6		8.2	50.4	9.6	L	9.5	40.1	27.8		9.5	26 7.3	12.1	
9.5	59.5	34.1		9.2	59.7	25.0		9.4	59.8	36.1		9.0	55.3	47.0		7.1	19.1	48.8	G
8.8	34 2.4	25.6		7.8	48 18.3	37.5	L	9.3	1 9.0	9.8		9.3	13 10.4	34.0	B	8.5	52.0	28.9	
9.1	4.1	13.1		9.3	21.9	8.3		8.5	10.0	52.7		9.3	35.9	42.8		6.0	27 12.5	49.1	G
9.4	21.5	40.1		7.0	23.1	54.9	L	6.2	10.8	25.3	A	8.9	44.7	54.4		9.5	20.9	11.0	
9.5	31.0	47.0		9.0	44.3	55.5		9.2	44.1	5.0		9.5	53.9	4.7		9.4	38.0	52.5	
9.0	45.4	51.2		9.5	49 41.6	3.7		9.3	55.8	24.9		9.3	57.5	46.7		9.0	38.2	49.0	B
8.2	35 8.7	30.2	L	9.2	54.1	45.7		9.2	2 0.5	6.8		9.0	14 0.8	41.7		9.5	28 59.1	7.8	
9.4	10.5	49.0		9.0	50 34.9	28.5		9.3	6.8	35.3		9.0	2.4	0.2		9.5	29 15.4	15.2	
9.0	16.4	12.9		9.4	43.2	14.1		9.5	12.3	51.5		9.2	8.5	30.7		8.9	36.5	4.9	
9.3	23.1	16.1		8.9	48.2	58.8		9.5	25.1	42.7		7.9	14.2	24.9	B	9.5	48.8	52.3	
9.3	23.6	18.1		9.0	51 41.4	6.4		9.3	42.0	10.2		9.5	20.8	11.7	B	9.4	51.4	38.1	
9.5	24.2	2.7		9.5	52 16.8	19.7		9.5	3 19.8	16.1		9.4	35.0	26.6		9.2	30 1.5	57.1	
9.2	33.4	7.4	B	9.2	43.0	21.9		9.3	4 3.0	58.1		9.2	46.3	45.1	B	9.4	24.2	32.3	B
9.0	36 1.3	36.2		9.1	53 0.9	42.4		9.5	10.1	6.4		9.1	49.2	45.1	B	9.5	29.8	46.7	
8.9	4.2	42.7		9.5	40.4	15.7		8.6	10.6	18.1	A	9.0	51.8	53.3		9.5	33.4	12.5	
9.2	10.2	23.2		9.2	49.0	14.4		9.5	33.3	44.8		8.1	59.1	31.4	A	6.3	36.8	21.6	A
8.4	15.5	45.4	L	9.5	57.2	23.9		9.5	35.2	34.7		9.3	15 11.8	6.7		9.3	39.1	12.7	B
9.5	55.3	35.3		9.1	59.5	26.1		9.5	45.4	53.0		9.3	24.1	55.6	B	9.5	43.1	5.1	
9.5	58.3	59.3		9.0	54 24.7	2.8		9.3	58.8	24.7		9.4	30.8	5.0		9.5	45.6	53.4	B
9.3	37 13.4	16.9		9.5	31.4	18.4		9.5	5 4.5	14.7		8.5	56.3	0.6	A	9.5	46.8	56.7	
9.5	25.5	29.8		9.2	39.7	42.8	B	9.4	13.9	2.1		8.5	57.8	2.1	A	9.5	48.1	32.2	B

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	20ᵘ	+51°			20ᵘ—21ᵘ	+51°			21ᵘ	+51°			21ᵘ	+51°			21ᵘ	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	30 50.8	53.2	A	9.5	46 5.3	2.0		9.5	10 38.4	30.8		9.5	26 42.5	59.7		9.1	41 18.9	9.6	A
9.4	31 18.0	0.9		6.8	44.0	50.9	A	9.5	46.0	27.4		7.5	27 8.9	14.9	L	9.4	20.6	4.5	
9.5	41.4	55.5		9.2	44.8	41.8		9.5	11 6.1	49.2		9.5	34.0	32.7		8.3	25.4	50.3	L
9.5	54.0	30.4		9.0	59.8	22.4	A	9.2	42.2	19.1		9.2	40.7	44.2		7.5	27.4	27.4	G
9.2	32 33.7	54.1		9.4	47 11.6	52.9	B	8.3	42.3	52.4	A	9.2	28 3.7	5.5		9.5	55.6	15.8	
9.3	35.6	47.7		9.5	19.7	54.4		8.7	51.9	55.8	A	9.4	4.4	9.9		9.0	58.7	42.6	
9.5	53.9	13.2		9.2	30.4	21.6	A	8.9	56.6	52.4	A	9.4	33.0	34.8		9.4	42 1.0	32.8	
9.5	33 0.5	28.4		9.5	48 55.5	22.2		9.4	12 12.5	27.1		9.3	42.2	43.7		9.5	9.9	5.5	
9.5	18.6	13.9		9.5	49 11.0	57.0		9.2	25.6	54.7	B	9.4	29 11.5	37.7		9.1	14.4	31.4	
8.5	20.1	4.7	A	9.4	19.5	10.6		9.3	31.5	58.9		9.1	21.6	17.0		9.4	25.3	55.9	
7.2	52.9	29.6	A	9.5	50 4.1	34.9		9.5	47.2	20.0		6.4	28.1	3.2	G	8.7	35.7	15.1	
9.4	57.5	16.0		9.5	51 50.8	8.6		9.1	50.3	33.8		9.1	30.5	37.6	A	8.7	36.2	10.5	
9.4	34 2.9	32.8		8.5	52 17.4	21.6	A	9.2	50.6	3.7		9.5	43.8	48.0		9.5	38.3	0.3	
7.2	8.5	52.1	A	9.5	57.8	8.6		8.3	13 5.7	27.0	A	9.3	51.9	40.4	A	9.0	55.9	41.7	
9.3	44.1	49.6		8.4	53 42.0	57.7	A	7.4	11.1	51.8	A	9.5	52.9	37.8		9.0	57.9	3.2	
8.4	35 2.7	16.2	A	9.2	54 4.9	1.7		9.3	45.5	55.6		8.5	54.4	39.3	A	9.5	43 14.0	48.2	
9.5	12.8	57.7		9.2	5.3	13.5		9.0	55.0	24.6	A	9.4	30 19.9	50.0		9.4	21.4	27.1	
9.5	14.9	58.8		8.0	21.6	45.8	A	9.2	14 2.6	53.8		9.5	19.9	42.5		8.6	48.3	48.5	
9.4	23.3	58.4		9.4	53.4	3.8		9.2	3.8	37.2	A	9.0	22.8	31.2	A	9.4	44 2.0	37.2	
9.2	30.5	56.8		9.5	55 55.4	4.2		9.5	24.8	20.0		9.3	25.0	44.4		9.2	2.9	58.6	
9.2	48.3	38.1		9.5	57.3	27.6		9.1	30.5	52.8		9.5	31 1.3	45.3		9.4	6.1	44.2	
9.1	52.4	49.3		7.0	56 40.0	34.2	A	7.2	40.7	42.7	A	9.4	6.5	50.4	B	9.3	20.4	19.9	
9.2	36 16.7	17.5		9.5	57 5.5	23.6		9.1	54.9	53.6		8.3	11.3	0.6	A	9.5	45 6.2	5.8	
9.5	44.3	23.4		9.5	23.5	25.4		9.5	15 10.5	37.7	A	9.5	26.5	48.2		9.3	22.5	29.7	
9.5	51.8	57.5		9.5	40.3	48.0		9.5	28.0	53.0		8.2	32 29.7	0.5	A	9.5	36.4	48.3	
9.1	57.0	26.9		9.5	47.8	54.0		9.2	29.3	17.4		9.3	51.0	2.0	A	9.3	46 5.9	7.9	
9.4	38 14.4	3.8		9.5	58 0.0	21.5		9.5	16 37.4	6.1		8.8	53.6	21.9		9.5	15.8	57.8	
8.8	15.2	17.2		9.5	28.0	39.9		9.1	48.0	30.4	A	9.4	33 12.5	57.2		9.4	16.9	21.5	
8.2	33.7	35.0	B	9.5	59 6.3	46.0		9.4	55.5	22.7		8.0	50.3	51.4	A	9.4	32.6	32.9	
9.4	36.4	4.0		9.2	42.4	30.1		8.5	17 39.6	40.8	B	9.5	34 0.6	17.7		9.5	38.8	40.4	
8.5	42.3	49.9		7.3	0 3.5	49.3	S	8.8	41.8	41.4		9.0	12.0	9.1	A	9.5	57.5	12.5	
7.2	46.2	46.4	F	9.5	25.0	30.4		8.8	55.5	36.1		7.3	17.8	42.5	A	9.5	47 13.3	58.7	
9.0	49.6	50.3		9.0	1 3.8	47.9		9.5	18 7.2	4.9		9.5	28.6	41.8		9.5	15.9	22.7	
8.2	57.0	19.7	B	9.5	44.1	52.1		9.3	19 6.5	6.9	B	8.8	46.2	22.0	A	9.4	47.4	39.0	
9.0	39 6.1	2.2		8.4	2 14.3	25.1		6.7	7.1	2.3	G	9.4	35 14.0	57.5	B	9.5	48 1.5	25.5	
9.5	8.5	11.4		9.3	22.4	43.3		8.8	15.3	27.1		9.1	18.7	37.8	B	9.5	14.3	2.4	
8.9	12.8	45.1		9.0	45.3	27.7		8.2	17.0	49.7	A	9.5	29.0	5.2		9.2	22.5	25.9	
9.5	28.3	32.7		7.2	57.9	0.0	G	9.0	50.8	52.7	A	9.5	31.4	53.1		9.4	28.8	16.1	
9.5	54.6	59.1		9.5	3 2.2	17.6		9.5	53.3	1.0		9.1	41.6	26.3	A	9.4	35.2	19.6	B
8.5	58.9	12.0		9.0	4 6.5	12.3	A	9.4	20 11.4	27.8		9.5	44.3	8.3		9.5	51.0	27.9	
9.5	40 21.8	37.4		9.1	23.0	10.5	A	8.4	19.6	51.2	A	9.5	36 27.5	39.8		9.4	51.4	44.8	
9.0	34.9	30.0		9.5	36.3	44.9		9.5	23.4	36.4		9.4	34.1	20.4		8.7	54.4	4.8	
9.4	41 2.7	20.1		9.2	41.9	2.5		9.5	30.1	42.8		9.5	43.6	15.9		8.3	56.8	38.8	B
9.4	11.8	50.9		9.5	53.4	14.5		9.5	42.9	52.8		9.3	56.5	46.6		8.8	49 25.1	21.7	
9.3	12.7	1.2		9.5	56.0	57.0		9.2	59.2	34.4		7.1	37 2.4	37.7	A	9.5	45.0	27.1	
9.5	24.0	5.0		9.4	5 26.7	21.5		9.5	21 23.5	1.8		9.1	26.5	4.9	B	9.5	53.2	36.2	
9.5	42 0.4	27.1		9.2	27.1	11.2		9.3	25.7	45.1		7.7	38 14.3	44.5	G	7.6	50 18.8	50.4	L
9.4	5.4	2.8		7.8	41.5	50.0	A	9.5	33.6	17.4		9.5	17.0	3.9		9.3	28.6	50.2	
9.5	23.3	1.7		9.5	6 26.8	38.7		9.5	23 12.4	28.2		9.2	17.9	13.1		9.5	42.9	32.2	
8.3	25.6	38.1		9.2	35.2	49.6		9.5	55.8	0.3		9.5	52.1	8.4		9.5	53.7	42.6	
7.7	51.0	15.7	A	8.4	7 4.1	25.8	A	9.2	24 5.6	40.3		9.3	39 34.8	55.4		9.0	51 5.5	25.3	
9.5	43 26.8	36.5		9.5	6.9	53.0		8.2	10.8	27.8		9.0	37.2	8.1	A	9.3	6.4	6.6	
9.1	29.7	12.3		9.5	32.7	12.0		9.5	13.5	15.5		9.1	38.5	50.1		9.2	9.5	26.8	B
6.0	33.9	52.9	A	7.9	8 5.4	13.9	A	9.5	55.9	41.2		9.4	45.9	11.4		8.3	20.9	50.3	
9.3	49.7	34.1		8.8	9 8.4	58.0		9.0	58.6	13.0	B	7.1	40 7.2	36.0	G	9.5	46.5	43.3	
9.5	52.8	38.7		8.7	25.3	20.8	A	9.1	59.7	14.7		8.8	19.6	43.5	L	9.5	46.8	59.6	
6.0	44 19.9	22.4	A	9.4	35.4	58.6		9.4	25 20.8	17.7		9.1	30.0	34.1		9.5	50.3	8.2	
9.5	51.4	56.6		9.3	43.6	4.4		6.8	26 23.9	33.0	G	9.5	59.7	49.0		9.0	52 2.4	10.7	
9.5	45 46.9	7.8		9.5	45.5	27.2		6.5	35.4	58.9	A	9.5	41 16.9	41.0		9.2	5.5	27.8	
9.5	57.9	29.2		9.5	54.6	59.4		9.5	35.8	59.5	B	9.3	17.0	30.4		9.2	6.3	38.0	

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	21u—22u	+51°			22u	+51°			22u	+51°			22u	+51°			22u	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	52 14.8	59.6		9.4	3 7.7	42.3		9.0	12 26.5	48.4		8.0	21 47.2	13.9	A	9.3	34 18.5	50.4	
9.4	34.0	26.7		9.3	17.2	43.7		9.2	47.4	17.6		9.0	54.9	40.0	A	8.8	21.6	31.2	A
9.3	34.6	52.2		9.5	18.1	58.5		9.2	13 2.0	35.4		9.4	22 7.5	34.7		9.4	35 1.7	3.6	
9.0	35.1	2.0		9.4	4 4.9	6.4		7.5	3.1	55.9	A	8.6	16.2	27.6		7.1	2.9	0.2	A
9.5	42.3	19.7		9.5	8.8	11.3		9.5	11.9	13.1		8.9	26.8	9.9	A	9.2	22.0	37.2	
8.9	47.9	52.0		9.5	18.8	39.6		9.5	12.4	7.5		9.5	27.1	10.3	B	9.5	33.5	12.4	
8.6	57.8	33.5	A	9.3	21.7	44.5		8.5	18.0	18.0	A	9.4	58.7	53.2		8.5	36 9.2	48.5	A
9.0	53 26.7	44.5	A	9.3	27.4	53.6		9.5	22.5	42.2		9.4	23 1.1	48.1		9.5	17.6	47.4	
9.1	35.6	57.6		9.5	34.3	8.0		8.2	28.7	57.0	A	9.4	2.0	2.2		8.3	25.6	26.0	A
9.3	46.7	59.7		9.5	41.0	47.2		8.5	29.4	23.7	B	9.2	7.5	21.0	B	9.5	43.7	51.3	
8.7	56.1	42.4	A	9.3	46.8	51.8		8.9	31.3	10.4	A	9.5	21.3	23.6		9.5	37 6.9	49.6	B
9.3	54 2.5	46.6		9.5	5 24.7	4.8		9.4	54.2	9.8	B	9.4	29.0	3.9		8.7	20.4	27.7	A
8.8	17.9	41.3	A	8.5	29.7	41.8	L	9.5	57.5	52.4		9.2	40.9	13.8		9.5	40.5	48.8	
9.5	26.0	6.0		8.5	33.1	27.9	A	7.5	14 13.8	16.6	A	8.5	45.7	38.0	A	9.4	57.6	12.7	
8.8	30.6	8.3		9.4	41.3	6.4		9.0	15.1	33.8	A	8.0	47.0	45.2	L	9.3	38 16.3	25.9	B
9.3	40.2	3.9		8.7	44.0	26.6	A	9.4	25.5	33.8		6.7	24 7.0	40.0	A	9.2	22.4	14.6	
9.5	40.5	25.7		8.0	46.5	36.0	A	8.4	25.5	2.1	A	9.2	19.4	12.3		9.0	33.4	59.3	
9.4	53.9	12.7	B	9.3	48.8	53.1		9.2	36.6	1.2		9.4	23.7	47.7		8.8	37.5	51.7	
9.5	56.8	59.5		9.5	6 0.0	49.6		9.0	37.9	34.8	A	9.2	24.8	5.5		9.5	44.1	23.2	
9.5	59.7	18.4		9.5	8.7	35.2		9.2	38.5	59.0		9.1	29.6	22.6		7.0	48.3	45.1	G
9.4	55 17.1	50.2		7.7	9.8	43.0	A	7.5	43.7	7.9	A	9.4	43.6	25.9		9.3	39 1.8	52.1	
8.4	26.2	51.0	A	9.2	26.5	15.0		9.5	44.8	12.0		9.5	50.9	12.5		9.0	46.5	45.6	
9.5	30.3	12.9		8.8	28.9	31.1	B	9.5	15 5.7	9.2		9.5	25 3.6	27.1		9.4	55.1	46.5	
9.4	46.3	48.2		9.5	35.8	26.3		9.2	10.1	27.2		9.5	20.1	18.6		8.0	40 2.3	20.3	L
8.2	51.4	23.6	A	9.5	37.3	34.7		9.5	18.0	17.5		9.5	27.2	29.3		9.5	22.5	51.5	
9.5	59.9	1.0		9.3	47.4	52.9		9.5	34.5	32.2		9.5	27.2	30.1	B	9.1	54.2	26.0	B
9.5	56 6.1	58.7		9.0	55.2	9.7		9.3	40.0	43.9		8.7	26 3.0	52.1		8.9	41 3.0	21.9	B
9.2	12.3	10.0		9.0	59.3	59.9		9.2	42.6	4.0		9.4	3.2	24.3		9.5	22.7	24.7	
9.5	23.9	7.3		9.5	7 20.4	47.1		9.5	16 6.5	7.6		9.4	3.2	2.7		8.8	28.6	10.4	A
9.5	24.6	2.4		9.5	33.1	58.3		8.9	12.4	58.7	A	8.8	29.0	10.7		9.0	43.2	57.8	A
9.5	57 2.0	15.4		8.8	54.2	34.5		9.5	39.7	55.1		9.5	27 1.3	17.1		7.8	47.1	12.3	A
9.1	25.7	48.7	A	9.5	8 4.1	48.2		8.8	45.9	54.1		9.5	19.3	14.2		9.1	54.1	35.7	
9.5	42.8	19.3		8.0	4.1	50.8	L	9.4	58.7	7.9	A	9.5	30.8	56.4		9.5	42 37.5	21.6	
9.5	44.5	57.2		9.5	5.3	49.6	B	8.5	17 0.1	11.8	A	9.5	52.2	54.0		8.9	42.4	6.2	A
9.5	58 5.6	12.0		8.0	9.7	40.2	G	9.3	2.6	0.2		9.0	28 9.4	54.3		9.5	53.1	31.4	
9.5	8.6	45.2		9.5	10.6	6.3		9.1	15.2	12.4		9.4	21.5	54.8		8.6	54.3	11.4	A
9.4	15.5	40.3		9.5	34.1	53.6		9.0	29.9	27.8		9.4	29 11.6	47.6		9.5	43 2.3	46.0	
9.1	30.9	25.9		7.3	52.4	47.5	G	4.7	51.7	30.1	A	9.5	13.0	15.4		9.4	13.3	48.0	
9.2	43.2	23.9		9.4	55.6	3.3		8.5	55.3	44.5		8.8	22.5	10.5		9.4	20.1	9.3	
9.0	59 5.8	57.6		9.4	9 12.4	46.5		9.5	59.0	54.5		8.7	48.9	59.5		9.5	22.4	51.0	
9.4	25.4	26.3		9.5	16.0	42.0		8.6	18 27.9	22.4	A	9.4	30 29.5	5.0		9.2	32.3	49.5	B
9.4	38.0	4.7		9.5	30.2	25.2		8.8	34.6	37.7		9.5	34.5	41.7		9.5	57.2	23.6	
8.5	53.0	39.8	B	9.3	31.4	20.1		8.5	40.1	51.5	A	9.3	39.4	33.6		9.4	44 17.8	18.1	
9.0	58.5	34.3		9.5	48.7	45.1		9.5	42.3	22.9		9.4	51.0	43.9	B	9.2	22.6	22.8	
9.5	0 35.9	42.4		9.5	54.0	57.0		9.3	51.4	27.2		9.5	31 7.1	56.2		7.2	34.4	16.7	A
8.8	55.2	9.7	A	9.4	56.4	58.4		8.9	54.1	20.8	A	8.4	11.7	8.9	R	7.3	55.5	30.1	A
9.2	1 6.5	44.9		8.5	10 3.0	8.9	A	9.5	19 4.4	54.4		9.4	30.3	51.7		9.1	45 8.7	43.6	
7.0	12.6	6.0	A	9.2	26.8	6.3		8.5	7.7	9.7	A	9.0	51.6	55.9		9.5	14.1	51.8	
9.4	27.6	11.5		8.8	34.4	46.5	B	8.4	8.8	24.1	A	9.4	53.3	24.0		9.4	21.5	39.3	
9.5	34.3	32.2		8.8	46.9	7.5	A	9.4	33.5	14.5		9.0	32 1.7	17.9		9.4	25.1	32.2	
8.7	48.5	55.6	A	8.8	50.2	59.8		8.9	35.4	6.3	A	9.4	6.2	47.8		9.4	47.3	31.3	
9.1	58.6	53.1		9.5	50.6	50.0		8.2	59.2	42.0	A	9.5	16.2	8.1		9.4	57.6	10.9	
8.8	2 2.5	0.7	A	9.5	52.6	51.2		9.3	20 26.7	6.3		9.0	25.7	37.4	A	9.4	46 1.0	15.4	B
9.3	11.1	2.0		9.5	11 2.7	16.8		9.5	45.9	16.6		9.5	26.2	36.9	A	9.4	18.1	55.8	
9.2	29.7	23.7		9.1	19.7	18.7		8.2	47.6	36.9	A	9.5	42.3	29.5		9.5	41.5	40.0	
9.3	34.0	55.7		9.5	59.1	37.3		9.2	56.7	4.6		9.0	51.9	4.1	B	9.5	47 8.0	30.5	
9.1	49.5	8.9		9.2	59.3	33.8	B	9.5	21 8.3	29.7		8.8	33 44.7	19.7	A	8.7	11.1	57.2	A
9.4	55.7	6.4		9.5	12 0.2	42.4		9.5	8.4	46.8		9.5	52.0	59.7		9.2	22.0	51.7	A
8.9	55.9	37.5		9.4	4.5	53.2		9.4	26.1	43.4		9.4	59.6	50.0		8.5	23.8	55.1	A
9.5	3 1.7	35.7		8.9	24.5	22.3		9.4	41.9	52.2	B	9.1	34 5.1	58.2	B	9.4	43.6	44.0	

3501—3558				3559—3616				3617—3674				3675—3732				3733—3786			
	22u—23u	+51°			23u	+51°			23u	+51°			23u	+51°			23u	+51°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	48 16.3	53.7		8.0	6 7.6	5.7	A	9.4	21 46.0	55.8		9.5	31 53.0	2.5		9.4	46 13.2	38.6	
9.3	49 1.3	6.4	B	9.5	7 19.3	2.0		9.2	53.1	49.2		7.8	32 3.0	27.8	J	8.0	19.1	7.7	A
8.0	14.2	51.5	A	9.3	25.5	31.2		9.1	55.7	43.0		9.2	26.4	52.6		9.2	26.4	25.8	
9.0	48.6	40.7	A	9.5	26.9	39.2		9.5	22 0.6	30.9		9.4	42.0	23.2		9.1	51.7	58.0	R
9.3	50 13.7	13.0		9.3	8 2.8	4.3		9.0	7.5	40.3		9.5	57.9	38.0		9.3	47 11.7	48.0	
9.0	22.5	19.4		8.8	5.1	19.5	L	9.2	7.9	27.6	B	9.0	33 8.7	12.4		9.4	15.4	6.0	
9.1	28.1	39.8	A	9.4	24.2	48.0		8.5	36.9	52.5	A	9.5	14.4	20.8		6.5	48 15.3	56.0	A
9.1	30.9	0.5		8.2	37.2	34.0	A	9.2	46.1	57.9		7.3	45.1	45.4	B	9.5	23.8	52.0	
9.5	46.2	23.3		8.7	39.4	21.3		8.7	47.0	47.5	A	8.9	48.1	55.8		9.4	52.4	8.2	
9.5	51 12.2	0.8		9.5	9 0.7	38.5		9.1	54.2	17.8		8.4	34 20.7	37.9	A	9.5	49 11.5	54.7	
9.5	29.1	42.8	B	9.5	9.0	13.6		9.3	55.7	27.1		9.5	44.1	42.8		9.5	28.7	49.9	
8.8	35.9	56.6		9.2	13.6	30.5		9.5	23 30.5	51.5	B	8.9	53.6	13.9		8.1	39.6	21.4	B
9.4	52 15.6	39.5		9.5	19.0	40.5		9.5	58.1	7.5	B	9.4	35 5.5	42.8		9.4	49.1	5.3	B
6.0	53.8	51.8	G	9.5	26.8	3.8		7.3	24 27.4	36.6	L	9.3	7.8	11.9		9.5	56.1	5.8	
7.0	55.0	32.6	G	9.1	48.2	41.7		9.3	37.9	49.4		8.8	21.3	34.6	A	9.2	50 13.6	10.9	
9.5	58.2	11.7		9.2	58.9	42.5		8.5	25 5.8	44.1		9.0	42.4	29.2	A	9.5	30.7	4.6	
8.7	53 17.8	38.3	B	9.5	10 24.6	13.6		9.1	7.3	3.8		9.5	51.4	51.5		9.4	53.1	6.7	
9.4	39.6	29.0		9.5	25.0	10.6		9.5	21.0	26.2		6.5	36 0.7	8.0	A	8.5	51 33.4	1.2	R
8.8	43.3	36.6		9.0	57.7	30.6		9.0	23.8	6.7		9.5	0.9	26.3		9.3	35.7	30.2	
8.9	54 21.4	6.7	A	9.4	58.3	42.0		9.5	32.9	41.7		7.6	9.3	26.3	A	9.1	48.1	32.4	
9.4	27.6	23.5		9.3	11 5.8	38.9		9.5	33.0	28.9		9.5	26.8	39.4		9.5	52 29.9	27.3	
9.5	39.1	7.8		9.5	50.7	24.3		8.4	56.3	5.3	A	9.5	41.7	17.1		9.5	35.4	27.4	
9.5	45.2	56.8		9.2	12 4.5	57.1		8.2	26 5.1	14.7	A	9.5	37 22.3	23.0		9.1	53.8	51.0	
9.4	57.8	52.8		9.5	28.7	58.2		8.2	34.7	22.2	A	9.2	32.9	14.2		8.7	53 2.5	7.5	R
9.0	55 17.3	40.8		9.4	51.6	38.7		9.5	34.9	29.8		9.5	38.5	10.5		9.0	37.9	27.5	
9.5	56 12.0	2.6		9.5	13 27.1	3.3		8.9	45.2	54.3		9.5	40.0	41.5		8.8	38.5	16.2	
9.2	33.3	25.1	B	9.5	28.0	57.0		9.5	27 4.1	15.7		9.3	51.4	6.5		9.3	38.6	33.5	
9.4	45.8	26.0		9.0	14 18.7	46.3		9.4	13.7	3.7		9.5	59.6	47.2		9.0	43.0	48.4	
9.5	46.6	55.9		9.5	37.2	9.1		9.2	36.7	46.6		9.5	38 20.1	0.9		9.0	54 19.7	24.5	
9.3	57 1.9	1.9	A	9.1	43.3	5.3		8.8	43.1	17.3	A	9.5	28.7	54.2		9.0	22.5	58.3	
9.5	7.0	26.6		9.5	44.0	58.0		7.9	52.6	48.5	L	9.5	45.5	41.3		9.5	38.5	47.2	
9.3	13.9	23.8		9.5	59.1	47.5		8.9	55.0	13.2		9.4	39 7.7	20.7		8.6	56.3	46.7	
9.4	52.4	28.5		9.3	15 5.5	18.5		8.5	28 0.2	52.9	L	9.1	8.5	31.7		9.3	55 5.5	45.1	
8.9	54.3	20.6	A	9.4	13.9	20.2	A	8.5	3.0	5.0	A	9.3	30.9	29.1		8.8	6.9	1.3	R
9.5	55.1	32.0		9.5	26.6	10.6		8.4	3.3	1.5	A	9.5	47.5	17.0		9.2	11.6	46.5	
8.8	58 14.0	40.0		9.4	16 2.9	28.8		9.0	11.6	59.2		9.5	50.2	9.0	B	9.3	38.5	0.2	
9.1	59 40.9	55.7		9.2	6.7	19.7		8.5	23.1	35.4	G	9.3	40 2.7	32.0		8.2	42.7	39.5	L
9.2	47.6	37.3		9.5	27.0	28.8		9.4	30.0	40.2		9.5	4.5	7.9		9.1	56 15.4	26.3	
8.0	55.5	22.0	A	9.3	31.4	6.9		6.5	31.0	29.2	G	9.4	20.0	46.7		9.5	37.4	56.6	
9.4	1 5.2	48.0	B	8.0	36.6	18.3	A	9.3	40.1	53.2		8.8	43.5	5.6		9.4	56.9	51.3	
9.2	5.4	56.2		8.4	51.9	15.9	A	9.1	46.1	53.1		9.5	48.7	48.9		9.1	57 4.7	1.4	A
9.1	18.5	41.2		8.1	57.7	54.9	A	9.1	51.6	59.1	B	8.6	50.0	1.8		9.3	6.8	17.1	
9.4	34.8	41.2		9.5	17 31.9	20.8		9.1	52.0	52.4		9.5	41 0.5	24.7		9.4	11.9	9.2	
9.2	2 17.6	41.3		9.5	49.8	56.3		8.7	55.1	48.9	B	9.4	19.2	48.1		9.0	25.4	10.3	A
9.1	36.9	50.1		9.4	18 25.0	2.4		9.0	29 5.2	50.2		9.0	44.5	1.3		9.2	27.9	45.5	
9.5	37.9	12.5		9.4	46.4	21.8		9.2	8.9	57.1		9.4	42 13.1	28.6		8.9	28.4	26.4	
9.0	3 12.2	19.8	A	9.5	48.2	2.9		9.4	28.4	58.7		8.8	22.4	50.8		9.5	53.5	18.0	
9.5	25.4	53.0		9.2	53.9	53.2	B	9.0	32.0	22.0		9.3	29.6	39.5		9.0	58 50.7	50.5	
9.4	26.5	57.0		9.2	54.4	52.3		9.0	34.7	49.3		9.1	35.9	58.5	R	9.5	54.9	26.1	
8.7	30.1	10.9	A	9.5	19 36.8	24.0		8.1	58.6	29.0	B	8.7	46.8	18.5		9.2	59.9	25.1	
9.4	42.1	5.2		9.3	49.4	7.6		9.4	30 2.9	29.1	B	9.5	43 0.3	20.0		9.5	59 3.7	27.1	
9.4	4 3.4	47.7		9.5	58.2	41.0		9.4	7.8	43.6		9.0	28.4	6.0		8.8	5.7	27.6	B
9.0	25.4	8.5	A	9.5	20 22.6	0.8		9.5	40.9	49.1	B	8.5	46.2	25.1	L	9.0	30.9	11.2	
9.5	58.8	49.7		9.4	41.3	3.6		8.7	45.5	26.4	L	9.5	48.0	49.5		9.4	46.5	23.6	
9.1	5 19.2	35.1	B	9.4	46.2	1.5		8.1	55.1	52.5	L	8.4	56.5	16.9	A				
8.5	40.4	9.6	A	9.2	21 14.6	18.3		9.5	59.3	57.0		9.5	44 1.3	54.1					
9.4	42.9	17.4		9.2	21.8	1.6		8.9	31 8.0	18.9		9.5	19.4	16.6					
7.5	50.3	26.3	A	9.5	23.9	42.5		9.5	23.9	36.2		9.5	45 27.9	1.2					

Zone +52°

1—40				41—80				81—120				121—160				161—200			
	0h	+52°			0h	+52°			0h	+52°			0h	+52°			0h	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	0 5.4	44.9		9.4	11 35.8	13.4	A	9.5	22 11.0	30.3		9.2	28 45.9	44.1		9.5	38 16.0	17.4	
8.4	6.6	43.2	B	9.5	48.9	58.2		9.5	25.8	46.2		9.5	29 18.5	53.8		9.5	39 4.1	31.7	
8.4	14.1	18.3	L	9.5	12 26.5	53.8		9.4	26.0	52.4		9.3	19.6	49.5		9.4	6.2	35.3	
9.5	25.9	36.4		8.5	29.1	29.7	A	9.5	55.6	27.2		9.5	30.9	18.7		8.7	7.1	20.6	A
9.3	29.4	50.9		9.5	35.8	36.7		9.5	59.2	38.9		9.5	47.3	55.7		9.2	16.0	49.1	
8.0	33.2	59.1	A	9.2	59.9	19.1	A	9.4	23 6.3	29.6	B	8.9	49.3	58.3		9.5	39.8	54.0	
9.0	40.3	43.7		9.3	13 21.0	38.0	B	9.5	9.0	26.7		9.5	52.8	3.2		9.1	47.0	59.7	A
8.0	1 2.4	27.2	G	9.4	30.7	38.2		9.5	10.0	1.6		9.5	30 0.5	34.2		8.6	55.8	9.2	
9.5	27.8	20.0		9.2	38.0	21.2	A	8.8	35.7	16.7	A	9.5	3.4	5.5		9.3	40 22.0	30.9	
9.3	47.2	36.0		9.3	38.3	18.8	A	9.5	42.2	58.1		9.2	20.0	49.3		9.5	33.6	14.2	
8.5	2 17.1	43.5	L	8.2	14 11.4	40.5	L	9.5	43.2	34.7		9.1	21.2	32.8		9.0	41 4.4	25.3	
9.3	3 9.7	39.1		8.0	33.9	48.0	L	6.2	46.9	2.4	A	9.4	28.2	37.4		9.1	22.2	31.8	
9.5	21.2	38.4		9.0	49.6	16.7	A	9.5	24 3.8	31.5		9.1	33.4	57.8		9.0	30.3	4.8	
9.4	39.2	26.6		9.0	56.0	48.2		7.8	11.0	12.8	A	9.5	31 45.0	50.4		9.5	49.5	57.7	
8.3	39.5	36.8	L	8.7	15 0.7	23.2	A	9.3	14.4	20.0		9.5	32 12.2	46.9		9.5	42 8.4	29.2	
9.0	4 12.1	53.6		9.5	41.0	52.2		9.1	17.6	25.9		9.5	20.4	1.2		9.4	14.0	15.6	
9.4	15.6	2.6		9.4	56.0	41.2		9.5	22.7	41.5		9.5	22.2	48.6		9.0	43 0.9	57.9	
9.5	16.4	7.5		9.1	16 13.0	21.5	A	9.4	25 7.4	1.2		9.3	39.2	13.6		9.2	39.1	27.1	
6.5	32.9	49.4	L	8.8	31.2	26.1	A	9.5	26.8	9.8		9.4	49.0	49.4		9.5	46.6	11.5	
9.5	5 0.3	46.3		9.3	39.7	31.8	A	8.7	50.4	4.2	A	9.2	51.8	0.9	A	9.1	46.8	18.1	
9.5	16.8	27.1		6.0	17 18.0	14.7	G	9.2	56.3	19.8		9.0	33 0.1	58.6		9.4	51.9	4.2	
9.2	6 24.3	48.2		9.4	20.5	35.2		9.4	56.9	28.3		9.5	2.0	34.0		9.5	59.7	56.4	
9.0	38.9	15.7		8.7	25.9	2.2	L	9.4	59.2	26.1		9.4	2.8	56.3		9.2	44 10.6	57.7	
8.7	39.8	45.7	B	9.5	27.8	39.0		8.7	26 1.3	18.1		9.4	3.5	28.4		9.4	12.0	48.5	
7.4	43.3	3.2	L	9.4	58.0	18.5		9.5	14.2	38.3		8.7	6.2	13.5	A	9.5	15.9	2.0	
9.5	56.2	52.8		9.5	18 48.6	7.0		9.5	16.5	34.5		9.1	16.3	42.9		9.5	17.0	52.3	
9.0	56.9	58.0		9.0	56.5	27.5		9.5	27.8	48.1		9.2	53.5	23.5		9.4	18.4	36.5	
8.9	7 13.5	26.9		9.2	19 9.8	7.5		9.4	47.2	34.3		9.5	34 7.6	39.0		9.5	32.7	36.8	
9.5	20.2	59.5		9.5	13.0	34.4		9.5	27 2.0	21.1		9.4	15.8	6.7		8.7	45.3	5.5	
7.3	34.3	46.2	L	9.5	27.3	41.2		9.5	7.8	28.0		9.4	44.2	22.3		9.4	45 14.8	49.3	
9.5	8 12.4	40.5		9.3	48.5	8.9		9.4	11.7	54.8		9.5	35 7.3	10.5		8.2	28.0	28.2	B
9.1	9 7.9	3.6		9.4	20 0.0	47.6		9.2	14.9	53.7	B	9.5	18.2	37.5		9.5	35.4	2.5	
7.8	21.3	26.4	L	8.5	2.5	9.2	L	9.4	17.4	55.1		8.8	46.4	30.3		9.0	42.1	19.0	
9.5	31.5	7.1		9.3	17.0	52.1		9.5	28.5	23.2		9.5	36 7.8	48.7		9.0	47.2	50.9	
9.0	54.8	35.1		9.3	24.3	7.7		7.5	33.6	41.2	L	8.9	32.7	55.4		9.5	46 5.6	20.8	
9.5	10 2.4	28.2		8.7	41.7	14.1	B	9.5	57.9	38.5		9.5	34.0	23.3		9.0	15.8	29.4	
9.1	5.0	48.1		9.3	21 11.4	31.3	A	9.2	28 18.3	46.0		9.5	45.8	11.4		9.5	16.0	15.3	
7.8	3.7	54.3	B	9.5	25.6	26.8		9.5	25.6	32.3		8.5	37 0.3	45.5		9.4	29.8	1.5	
7.9	56.1	7.5	A	8.7	33.3	35.2	A	8.0	36.4	40.5	J	9.3	27.5	48.8		9.5	47 20.2	36.8	
9.1	11 20.7	29.6	A	8.9	42.0	13.8	B	9.5	44.6	21.7		9.0	41.2	31.2		9.5	29.4	4.6	

201—260				261—320				321—380				381—440				441—500			
	0ᵘ		+52°		0ᵘ—1ᵘ		+52°		1ᵘ		+52°		1ᵘ		+52°		1ᵘ		+52°	
m	′	″	′		m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	
9.0	47	41.5	8.4	A	9.3	58	26.8	22.9	9.5	14	11.6	55.9	9.0	26	16.2	17.5	A	8.8	39	1.3	31.3	L
9.2		46.9	5.6	A	6.3		33.7	43.3	G	8.5		16.3	42.6	6.6		19.3	36.1	A	9.5		6.0	14.6	
9.4		52.5	9.8		9.5		48.6	26.1		7.8		34.0	2.9	B	9.5		21.6	39.3		9.4		40.4	22.9	
9.5		57.9	5.4		9.5		53.2	11.8		9.5		36.9	28.8		9.5		57.1	36.2		9.5	40	28.6	4.2	
9.3		58.2	20.5		9.5		54.0	50.2		9.5		45.3	57.9		9.5	27	27.8	1.1		9.5		49.7	9.7	
9.4		58.9	3.6		8.1	59	28.4	30.6	B	9.3		57.3	43.5		9.5		41.2	44.1		9.0	41	34.9	25.9	A
9.5	48	5.8	42.5		8.4		37.4	3.2	A	9.1		57.7	59.2		9.1		51.5	21.9	A	9.5	42	10.9	35.5	
8.9		19.7	33.9	B	9.5	0	47.2	45.1		9.5	15	3.1	19.4		9.4	28	16.5	22.4		9.4		14.9	8.2	
9.5		34.9	12.7		9.5	1	2.0	25.3		9.5		13.6	46.5		9.4		17.2	18.9	B	9.2		16.9	6.9	
7.5		56.1	31.1	A	7.8		8.9	4.9	A	8.2		15.6	5.9	B	9.5	29	4.6	40.6		9.1		33.6	47.0	R
9.4	49	8.3	37.4		8.4		24.2	12.4	A	9.4		24.3	27.0		9.5		7.4	26.6		9.2		34.4	46.1	R
9.2		8.4	1.6		8.2		43.0	57.6	A	9.2		38.7	26.2		8.7		37.5	32.2		8.9		37.8	58.4	R
8.2		19.5	47.7		9.5		48.3	25.8		8.5		39.9	25.7	B	8.7		41.5	30.0		9.5		50.1	42.5	
9.3		39.2	52.4		9.2		52.2	28.7		8.7	16	9.1	26.5		8.8		42.0	37.2		8.5	43	0.9	16.9	A
9.2		51.2	28.2	A	9.4	2	44.8	36.2		9.4		16.0	56.4		8.8		46.8	14.7	R	9.5		1.4	50.9	
9.5		52.1	26.1		9.0	3	52.4	25.9		9.4		16.9	2.8		9.4		54.4	51.5		8.8		4.9	16.5	A
9.5	50	3.9	1.0		9.0		59.2	24.8		9.1		17.2	21.4		9.2	30	11.7	13.1	S	9.5		34.8	43.1	
9.5		19.8	0.5		9.5	4	4.2	39.0		8.8		23.2	39.4		9.5		15.4	17.1		9.5		44.0	29.8	
9.5		22.0	25.1		8.1		9.5	47.6	B	9.4	17	24.7	14.7		8.2		25.4	11.0	L	9.1	44	1.9	10.0	A
9.5		27.5	7.4		9.5		33.4	33.6		8.8		35.2	39.0		9.0		42.5	10.2	R	9.5		12.9	6.0	
9.5		33.1	36.2		9.5		44.9	33.3		7.4		37.2	22.5	L	9.5		57.6	42.3		9.4		31.2	14.3	R
9.2	51	0.4	56.2		9.5		53.8	38.8		9.2		49.0	23.0		9.5	31	1.7	43.6		9.5	45	4.8	47.8	
9.5		4.8	55.3		9.5	5	2.2	42.4		9.5		53.0	15.3		9.5		29.0	39.5		9.5		35.9	50.8	
8.9		7.0	9.9	A	8.7		45.2	15.2		9.5	18	25.1	24.9		7.5		41.4	50.1	B	9.5	46	4.2	7.9	
9.5		34.5	13.2		9.5		51.4	5.3		9.5		38.9	4.8		9.4	32	25.6	39.5		9.5		32.6	34.2	
8.5		35.9	17.8	A	8.6	6	7.4	3.9	A	9.3	19	11.2	38.0		9.0		33.4	38.5		8.5		45.8	53.7	R
8.8		43.0	11.7	A	9.4		18.1	50.5	B	9.0		21.4	43.5	B	9.5		35.9	7.7		9.5		48.2	0.9	
9.2		56.9	47.4		9.5		20.4	47.8		9.0		21.9	43.2		9.4		42.7	34.5		7.5	47	12.7	35.4	A
9.2		58.0	42.2		9.0		31.2	23.2		9.5		22.2	42.0		9.4		49.3	7.1		9.2		43.0	40.8	
9.5	52	14.6	19.3		9.5		50.6	49.3		9.5		27.5	21.5		9.5		51.5	31.0		9.5		53.9	50.1	
9.5		39.8	4.1		9.5		56.8	40.2		9.4		53.8	9.3		9.5		54.9	48.6		9.5		56.7	59.9	B
9.5		42.8	16.5		9.5	7	8.4	46.7		9.5		58.2	55.8		9.2		57.3	46.0	B	9.5	48	4.8	45.7	
9.5		45.0	54.3		9.3		16.4	0.5		9.5	20	0.9	45.3		9.4	33	0.5	11.5	R	9.4		20.6	48.1	
9.4		51.5	16.9	B	9.4		58.4	7.8	B	9.5		8.7	39.3		9.4		5.0	36.1		8.3		25.6	27.7	A
9.5	53	1.6	50.7		9.5	8	5.5	11.3		8.5		50.2	21.5		9.5		19.2	14.6		9.4	49	1.1	58.7	
9.4		7.5	17.5		9.5		6.7	54.3		8.5		53.6	36.0		9.5		51.6	10.6		7.8		3.7	21.8	A
9.5		8.4	47.5		9.1		10.4	59.5	B	8.8		54.1	45.2		9.5	34	17.3	33.4		9.5		12.6	54.3	
9.5		40.2	35.7		9.5		18.6	12.0		8.9	21	7.9	35.6		9.0		19.8	33.6	B	9.5		19.5	43.2	
9.5		47.3	27.6		9.5	9	0.0	45.1		8.8		12.5	20.7		9.5		23.0	50.2		9.5		41.6	38.2	
7.3	54	10.4	4.3	A	9.5	10	3.9	51.5		9.3		31.2	2.1		7.0		27.3	8.9	G	9.5		58.7	58.9	
7.5		39.2	21.6	B	9.5		26.2	14.6		9.5		34.5	47.3		9.4		28.4	11.5		9.4	50	4.8	7.9	
9.2		42.6	25.1		9.3		29.3	20.5		8.9		34.5	53.9		9.3		37.3	41.2		9.5		10.4	48.3	
9.4	55	0.4	46.2		9.3		32.2	8.8		9.5		50.2	17.9		9.4		57.5	33.1		9.5		30.5	31.1	
9.5		9.2	20.0		9.2	11	14.3	41.2		9.2	22	0.6	50.3		8.5	35	7.3	27.7	L	8.6		32.4	33.8	A
9.2		19.5	46.9		9.5		26.9	36.8		9.2		13.3	58.0		9.1		11.6	31.7		9.5		34.3	4.0	
9.5		20.4	52.2		8.4		35.2	6.2	A	9.5		35.3	10.9		9.5		25.7	39.5		8.4		44.9	32.7	A
7.9		25.2	18.5	B	9.5		49.9	40.0		9.5		37.0	6.1		9.5		42.9	11.8		9.0		54.8	16.2	
8.6		29.8	5.3		9.5		58.6	36.7		9.5	23	0.1	56.8		9.5		53.2	0.4		9.1	51	21.7	16.1	R
8.8		41.9	5.4		9.5	12	9.8	43.6		9.5		15.8	32.7		9.5	36	5.4	2.9		8.0		37.1	49.1	A
9.4	56	16.6	37.1		9.5		10.6	55.5		8.8		51.3	28.5		8.9		24.0	21.8		9.5		44.0	47.8	
9.0		23.2	26.6		9.5		15.5	56.2	B	8.4		57.0	16.9		9.5		43.1	34.3		9.5		49.3	6.4	
8.8		31.8	39.6		8.8	13	2.8	13.4		8.8		58.2	55.5	A	9.5		51.3	43.1		7.8	52	50.8	55.7	A
9.1	57	0.3	49.7		9.2		17.1	3.5		9.2	24	20.3	43.9		8.8		51.7	52.7	L	9.5		53.2	33.3	
9.4		9.2	31.4		9.5		20.6	47.4		9.1		24.0	14.5		9.5	37	37.9	42.2		9.1		58.4	26.0	
8.5		24.3	2.2	A	9.0		27.4	32.2		9.5		30.2	18.9		9.5		39.5	48.4		8.8	53	3.5	50.5	A
9.5		34.2	29.6		9.3		45.3	36.7		9.4		50.9	23.7		9.5		43.0	1.3		8.4		8.2	22.6	B
9.5		43.1	29.4		9.5		54.4	32.4		8.1		53.2	35.8	A	9.2		44.7	27.7		9.5		9.8	3.8	
9.5		44.6	12.7		9.5	14	0.0	10.5		9.4	26	2.7	55.4		9.5		53.8	12.5		9.1	54	28.4	6.8	A
9.5	58	6.1	16.5		9.5		5.4	41.9		9.5		4.5	27.1		8.8		54.1	8.5	L	8.9		39.7	12.5	B
9.5		26.3	50.8		9.5		5.6	29.9		8.9		13.2	20.4	A	9.4	38	41.0	33.3		8.9		41.1	15.5	

501—560				561—620				621—680				681—740				741—800			
	1u—2u	+52°			2u	+52°			2u—3u	+52°			3u	+52°			3u—4u	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	54 41.7	15.0	A	8.6	8 30.1	48.9	A	9.2	35 16.4	5.8		8.9	9 53.6	44.1	A	8.5	51 10.3	28.4	L
9.2	56.5	38.4		9.5	48.7	3.2		8.0	56.4	37.0	A	9.3	10 31.5	42.7		9.5	23.4	49.0	
9.4	55 16.5	26.8		9.2	9 4.4	54.1	A	9.5	36 4.6	44.7	B	8.5	11 10.0	57.2	A	9.5	27.9	39.2	
9.5	56 10.1	32.4		8.7	30.0	58.0	A	8.0	11.5	33.4	A	7.5	10.1	10.7	A	9.1	37.5	20.5	
8.9	20.3	48.8		9.1	45.5	19.2		9.5	37 29.6	3.7		7.5	18.6	6.4	A	8.7	48.3	20.8	L
8.9	31.6	1.2	B	9.5	10 2.1	39.6		9.4	49.4	20.4	B	9.5	12 1.5	24.5		8.8	52 1.7	14.1	B
9.3	32.4	56.2		9.5	41.2	25.6		9.5	50.6	12.9		8.9	14 1.4	38.2		9.5	21.4	7.2	
9.3	38.4	59.4		9.0	11 6.0	7.3		9.4	38 7.0	47.2		9.5	18.5	41.7		9.4	27.0	15.9	
9.5	57 32.5	36.0		9.1	21.8	58.7	A	8.3	39 8.0	25.1	L	9.2	28.3	5.0		9.5	28.5	20.4	
9.5	42.5	14.5		9.5	25.8	53.5		9.5	29.5	9.6		8.0	15 3.6	14.5	A	7.6	43.4	52.3	A
9.5	47.0	55.4		8.8	39.5	2.5		9.2	40 16.5	0.0	R	7.0	11.6	47.8	A	9.0	53 12.9	21.1	
9.5	57.7	47.9		9.0	58.2	4.4		9.5	17.1	44.6	B	9.5	37.7	56.9		8.2	13.5	55.3	A
9.5	58 12.6	31.4		9.4	13 24.9	33.2		8.7	20.4	20.6	L	8.2	55.5	23.5	A	9.1	54 9.3	24.8	A
9.5	14.1	31.7		8.0	50.2	1.4	L	9.5	41 6.5	7.3		9.3	17 4.0	1.2		9.5	14.7	44.4	
9.5	49.6	35.9		9.4	14 17.8	12.1		8.7	19.6	39.3	A	8.8	10.6	49.0	A	9.5	15.2	49.3	
9.5	59 3.4	27.9		9.0	34.4	47.5		9.5	30.0	7.9		9.5	38.1	3.7		9.5	20.6	19.9	
8.8	5.3	12.6	R	9.4	37.5	5.4		7.0	32.3	24.9	A	8.6	18 39.0	51.0	A	9.0	21.4	27.7	A
8.5	12.6	10.2	R	8.7	15 18.6	57.5	A	9.5	50.3	39.4	A	8.8	19 21.4	54.9	A	8.9	22.0	54.0	A
9.0	13.1	56.5		9.1	58.3	31.8		8.2	42 15.2	47.6	A	6.7	32.5	23.6	A	8.1	31.5	40.1	A
9.3	15.9	52.0		9.0	16 0.8	43.0	A	7.0	37.3	24.5	A	9.4	20 25.1	0.0		9.5	36.8	0.3	
9.3	19.4	35.7		8.5	17 27.8	50.0	A	4.2	43 59.9	9.4	A	9.5	22 4.6	13.8		9.2	58.2	44.7	B
9.5	41.3	34.4		9.2	34.6	53.9	A	8.8	44 18.5	47.2		8.7	36.7	27.4	B	9.5	59.6	41.6	
7.9	47.3	33.0	G	9.0	40.3	57.2	A	8.8	33.4	55.5		7.0	25 37.1	26.5	A	9.0	55 9.1	41.3	A
9.0	54.1	3.0		7.5	18 33.3	25.3	A	9.5	46 58.7	57.8		8.9	26 8.5	23.6	A	9.4	19.5	20.7	
9.0	0 26.3	5.5		8.8	50.7	53.3	A	8.8	47 25.5	19.0		8.5	27 32.7	7.3	A	9.5	34.0	45.2	
9.5	37.2	54.2		9.5	19 14.9	59.5		9.3	30.9	31.8		7.4	28 16.5	21.2	A	9.0	49.3	53.0	
8.8	40.3	13.2	A	8.3	48.9	24.6	B	9.5	48 32.3	38.5	B	9.4	30 10.6	49.7		9.3	56 33.8	33.6	
8.5	1 0.4	31.5	A	9.5	57.9	6.8		9.5	49 39.4	41.7		8.6	55.5	49.2		8.7	39.0	39.5	A
9.5	22.4	27.0		9.4	20 18.9	34.7		9.5	50 1.5	3.8		9.0	33 9.7	0.3	A	9.1	39.5	49.0	A
9.4	50.1	34.6	A	7.5	55.7	32.2	G	9.4	55.6	51.5		9.3	34 41.8	39.2		9.3	57 23.2	59.8	A
9.5	2 20.0	44.2		9.5	21 57.0	38.2		9.5	52 6.7	7.6		9.0	35 3.6	29.2	A	7.1	27.3	58.1	A
9.4	22.1	51.3		8.5	22 0.6	11.5		9.5	46.0	44.1		9.1	36 52.0	59.5	A	9.0	50.8	57.4	A
9.1	23.2	57.6		9.4	32.3	4.3		9.5	53 44.3	12.2		9.0	58.4	1.5		9.5	58 19.1	33.1	
9.5	25.5	10.5		9.3	52.5	21.0		3.2	54 20.0	56.0	A	6.5	38 32.2	12.2	S	9.5	25.6	21.9	
8.8	54.7	40.4	A	9.0	24 13.0	12.0		7.9	40.6	3.4	B	6.6	39 31.8	1.8	A	9.4	29.5	11.8	
9.2	3 2.1	46.2	A	9.3	13.7	8.1		8.0	55 25.8	9.1	A	8.6	40 27.2	3.6	A	8.5	59.2	37.2	A
9.5	5.2	58.9		8.8	17.4	46.5		9.2	34.6	51.2	B	9.5	58.8	2.7		9.0	59.9	6.7	
9.5	14.3	56.0		9.5	39.0	10.6		8.5	39.0	29.3	A	9.5	41 31.9	1.0		8.9	59 5.8	46.9	A
9.5	26.5	4.2		9.2	47.5	8.0		9.5	57 35.1	39.2		9.4	42 19.2	34.3		8.3	30.3	45.8	A
9.5	47.6	1.8		9.5	25 13.8	8.3		9.5	59.6	5.8		8.4	38.8	7.7	A	9.4	0 22.9	4.4	
6.7	53.0	22.2	A	9.3	34.0	36.8		8.9	59 47.5	22.0	A	9.5	43.7	30.6		9.5	32.2	31.6	
9.0	4 11.3	26.4	A	8.2	27 47.9	10.9	A	9.3	0 15.7	18.7	B	7.9	43.7	51.0	A	9.5	39.0	42.0	
9.1	18.2	9.7		9.5	48.4	52.9		7.0	29.4	35.8	A	9.3	56.4	6.7	A	9.5	1 2.8	57.0	
9.4	38.9	30.0		9.3	28 7.3	39.7		9.5	1 0.9	1.3		9.2	44 32.7	21.5	B	9.0	57.4	33.9	B
9.5	39.0	52.0		9.4	27.5	10.5		8.3	38.4	41.7	A	9.5	35.9	25.0		9.4	2 5.5	30.0	
9.2	58.4	15.5	A	9.5	29 45.6	40.7		8.3	2 9.0	19.0	A	6.5	40.4	12.7	A	9.5	9.7	29.8	
9.5	5 4.3	5.8		9.0	54.8	21.8	A	9.5	39.5	50.5		9.2	45 5.2	44.6		9.0	46.3	45.9	A
9.4	15.7	17.4	A	9.0	30 5.8	9.7		9.5	52.4	41.2		8.7	21.1	6.3	A	9.4	3 10.0	27.0	
8.6	28.2	53.7	A	7.5	19.3	10.2	A	9.4	3 10.0	51.0		9.5	46 49.9	16.1		9.5	50.5	35.2	
9.2	6 10.3	38.5		9.5	44.2	51.5		9.5	37.4	42.2		9.3	48 24.7	0.9		9.1	4 7.8	37.2	
7.9	55.1	2.9	G	8.9	31 15.8	3.7	A	9.5	4 35.0	57.3		9.5	26.5	29.4		9.3	40.0	27.2	
9.1	7 2.4	6.2		8.5	23.9	3.4	A	8.0	5 4.0	12.8	A	9.0	49 21.4	40.2		9.5	5 16.9	2.7	
8.8	10.1	47.7	A	9.5	34.1	58.9		9.5	45.2	54.6	B	9.3	23.3	16.3	B	9.2	21.3	36.2	B
9.5	17.7	58.4		9.1	38.9	16.1		9.3	6 48.8	50.5		8.5	24.4	31.4	A	8.8	30.9	19.4	A
9.2	23.9	42.5	A	9.5	42.2	49.1		9.1	7 25.4	55.4		8.9	40.0	33.9	A	9.5	43.0	56.4	
9.5	35.4	28.8		6.0	32 49.1	54.2	G	9.5	41.8	43.2		9.2	42.3	58.1		9.5	46.2	28.7	
9.2	47.6	49.6		9.0	33 13.7	7.5	A	8.9	8 27.2	15.6		9.4	57.9	38.7		9.5	46.7	30.2	
9.1	8 13.1	15.5		9.3	22.5	14.2		8.7	9 7.2	7.7		9.5	50 20.7	1.3		8.0	53.1	59.4	A
9.5	23.8	38.1		9.5	37.8	8.7		9.3	20.3	37.2		9.5	41.6	8.6		9.5	58.0	34.9	
9.0	26.4	46.3	A	9.3	35 16.0	15.7		9.0	39.8	35.3		9.5	51 2.0	10.8	B	9.4	6 3.8	41.7	

801—860				861—920				921—980				981—1040				1041—1100			
	4ᵘ	+52°			4ᵘ	+52°			4ᵘ—5ᵘ	+52°			5ᵘ	+52°			6ᵘ	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.2	6 30.9	46.5	A	8.5	27 11.2	27.3	A	9.0	56 23.5	1.2	A	8.9	27 57.5	38.8	B	6.7	0 7.8	40.1	A
9.0	36.6	0.5	B	9.5	58.0	54.3		9.5	47.6	31.6		8.4	28 13.0	48.7	B	9.0	1 13.8	45.0	A
9.5	52.3	37.7		9.5	28 5.4	7.5		9.1	48.4	9.0	A	7.2	29 6.2	28.3	A	8.8	36.3	56.2	A
9.3	7 4.6	2.0		9.1	11.0	5.0		9.4	49.9	11.7		9.0	38.2	18.2		8.6	44.3	11.5	
9.4	20.5	29.8		5.4	30.9	46.7	A	9.2	54.5	38.7		8.0	39.0	5.9	A	9.2	2 2.8	1.3	A
8.3	21.5	36.7	A	8.2	35.0	31.4	A	9.2	58 5.0	48.2		8.4	30 44.7	35.0	A	7.7	27.0	1.8	A
9.2	58.8	15.0		8.0	44.7	11.3	G	9.4	9.4	31.8	B	9.1	31 17.7	30.2		9.3	51.7	28.4	
8.7	8 19.0	30.9		9.0	29 24.2	19.3	A	8.5	26.2	7.1	G	9.0	23.2	8.9		9.2	3 38.7	38.0	
9.5	55.0	18.7		9.5	38.7	58.2		9.5	59 22.5	48.8		7.0	46.7	23.0	A	7.8	4 30.8	12.5	A.
8.0	9 27.5	59.5	A	9.5	39.5	2.7		8.6	28.1	34.0	A	9.5	32 24.2	50.7		9.4	34.2	7.6	
9.5	36.3	7.0		9.5	30 45.0	42.6		9.5	0 0.3	38.4		8.0	41.7	38.4	A	9.3	5 8.8	38.7	
9.5	10 11.4	35.7		8.0	31 31.4	51.2	A	9.4	9.7	27.6		9.5	33 30.2	37.3		8.3	35.3	21.9	A
8.5	11 1.9	59.0		8.7	32 37.3	42.5		9.1	38.8	9.4		8.2	39.4	34.5	B	7.9	37.7	34.6	A
9.3	18.5	3.8		9.5	54.9	55.1		9.0	2 11.6	50.5		8.1	54.5	5.8	B	9.5	53.9	48.5	
9.5	58.3	10.7		9.4	33 15.5	46.2		9.5	56.0	18.7		9.4	35 26.7	3.0		9.5	6 28.2	41.0	
9.4	12 37.2	30.5		7.0	35.4	3.3	A	9.5	3 22.0	29.6		9.1	57.0	7.9		9.5	30.7	36.1	
9.5	13 14.8	14.3		8.5	34 31.8	30.9	A	9.5	32.1	14.3		9.0	36 22.7	38.4	A	9.2	41.7	12.5	
9.2	14 24.9	29.2		9.4	54.3	7.9		9.1	5 22.0	5.8	A	9.5	46.9	19.3		9.0	8 0.6	25.8	A
9.5	15 1.5	30.1		9.5	36 9.4	21.0		9.5	59.7	19.7		9.2	54.0	29.6	A	7.7	9 15.7	12.5	A
9.3	10.7	47.4		7.5	35.3	50.3	S	8.9	6 35.6	12.9		8.0	59.1	30.6	A	9.5	37.8	20.4	
7.9	12.0	9.9	A	8.8	40.5	20.0	A	9.5	7 2.4	50.9		9.5	38 9.2	54.6		9.5	42.2	25.3	
9.5	16.4	27.3		9.5	37 17.9	51.5		8.2	11.5	40.0	B	9.5	39 44.9	29.8		8.4	55.2	34.6	B
8.0	36.3	30.9	A	9.2	50.9	44.1		9.4	8 20.7	57.4		8.9	40 44.2	8.4	A	9.1	10 1.5	13.9	
9.4	16 8.9	35.0		8.5	39 14.5	59.7		9.5	40.3	53.6		8.5	41 17.2	45.3	A	9.1	38.9	35.4	
9.5	32.8	24.6		8.7	44.9	8.5	B	9.5	9 32.4	58.0		9.5	42 7.5	28.6		9.5	11 23.8	20.4	
9.5	54.2	42.8		9.2	51.4	24.4	A	9.1	10 29.0	0.6	A	8.5	8.2	35.5	A	9.2	30.0	0.5	
9.2	17 12.0	19.3	A	9.1	40 2.9	33.3		8.5	30.8	3.1	A	8.8	36.2	40.9	A	9.1	12 45.2	25.2	
9.0	13.1	18.8	A	9.3	34.7	50.6	A	9.4	44.5	36.5		8.8	46.7	12.9		9.5	58.4	44.4	
9.5	32.4	3.7		8.7	47.3	29.9	A	8.5	11 2.4	35.6	A	9.1	49.5	5.3		9.5	15 6.7	18.0	
7.5	39.9	3.3	A	9.5	41 8.6	4.5		8.9	3.3	52.1		9.1	43 49.6	18.2	B	8.6	43.6	38.0	A
9.4	57.0	9.4		7.2	44.0	34.3	A	9.5	8.5	1.2		8.0	58.2	57.0	F	9.0	16 1.2	55.2	
9.5	58.0	10.5	B	9.4	42 25.0	0.0		9.4	35.2	47.6	B	9.3	44 23.0	48.2		9.5	17.8	52.3	
9.4	18 38.5	34.7		8.9	43 0.5	10.7		8.3	12 26.8	47.4	B	9.0	49.9	54.7		9.4	22.0	34.1	
9.5	50.9	30.3		9.5	35.9	58.2		9.5	56.5	33.5		9.0	45 38.8	50.3	B	9.5	17 1.9	3.9	
9.1	19 41.2	28.8		8.9	40.7	27.0		7.8	58.2	5.1	A	9.4	46 5.5	38.9		7.5	15.8	31.7	A
9.3	57.3	5.6		8.8	47.0	47.9	B	9.5	13 39.3	32.5		9.5	8.7	30.6		9.0	16.7	42.4	A
9.5	20 19.3	14.4		8.8	47.4	12.7		9.5	14 5.0	34.0		9.0	14.4	7.9		8.0	23.4	13.4	G
9.5	33.4	8.8		6.5	44 39.9	37.3	A	9.0	34.2	29.1		9.0	41.5	1.1		9.5	58.2	37.2	
9.5	42.3	25.0		9.4	45 14.8	45.1		9.5	15 4.1	12.9		8.9	47 16.9	28.6	A	9.5	18 26.3	37.5	
9.3	54.6	49.6		9.5	24.4	30.9		9.5	39.2	38.4		8.9	34.7	37.5		9.5	30.0	27.6	
9.0	21 22.9	30.0	R	9.5	35.5	31.9		9.5	18 21.2	7.5		8.4	42.1	23.2	A	9.1	31.9	59.6	
9.5	41.0	59.6		9.5	46 34.9	12.7		9.2	25.0	4.1		9.0	45.2	39.9		9.0	52.7	13.0	
7.0	59.1	29.2	A	9.5	55.1	35.0		9.5	56.8	19.8	B	8.5	48 21.4	19.2	A	7.7	54.2	52.3	A
9.4	22 2.0	28.8	A	9.5	55.8	44.6		9.3	20 16.0	53.1		8.8	39.2	21.0	A	9.5	19 2.2	38.4	
9.5	7.8	55.7		8.0	47 51.8	14.3	A	9.0	27.7	11.4		9.5	49 16.6	5.1		8.1	32.8	53.3	A
9.1	20.6	18.8	R	6.4	48 15.9	53.8	A	9.4	39.7	21.2		9.3	25.8	18.0		8.4	44.7	52.3	A
9.1	28.7	11.1		9.5	49.8	50.0		8.2	21 23.1	0.8	B	9.1	38.4	17.0		9.5	20 7.0	15.5	
9.0	42.1	41.9	A	9.5	52.1	4.5		7.9	53.9	32.4	B	9.4	50 14.3	48.4	B	9.3	39.1	30.3	
9.0	46.7	22.0	R	9.5	49 25.3	11.7		8.3	22 43.7	6.6	A	9.1	52.8	4.7		9.5	49.8	36.3	
9.5	23 3.4	3.0		9.5	50 2.8	54.4		9.5	45.7	32.0		9.4	51 14.4	47.0		9.5	58.7	58.9	
9.4	8.6	8.9		9.5	51 28.4	58.2		8.1	23 12.2	51.2	A	9.3	52 40.2	27.8		9.1	21 7.8	34.3	B
9.4	31.1	38.0		9.1	53 35.9	58.1		9.3	15.0	59.6	B	9.5	53 55.4	20.9		9.4	33.8	34.7	
9.4	24 32.0	53.9		9.5	58.0	37.3		8.5	24 3.2	28.1	A	9.2	55 23.0	44.5		9.5	40.0	6.0	
9.0	46.2	33.9	A	8.6	54 52.5	48.0	A	9.3	15.1	33.0		9.2	57 18.3	35.7		9.3	52.0	36.2	
7.9	55.2	34.3	A	8.5	53.2	28.4		9.1	25 7.2	17.8		8.5	26.8	25.3	A	9.5	22 2.7	48.8	
8.4	25 0.1	11.9	A	9.3	55 4.3	37.3		9.5	25.7	25.6		9.5	42.3	32.2		9.1	11.2	21.9	
8.7	26 15.2	36.7	A	8.9	9.8	46.5	A	9.1	26 6.7	47.3		9.5	45.1	20.4		7.0	21.1	33.5	S
9.5	36.2	29.9		9.3	21.2	1.7	B	9.1	16.3	40.9		8.4	45.3	46.5	A	7.5	23 33.6	59.0	A
9.0	27 0.2	24.8		9.4	42.7	51.2		9.3	27 35.6	33.6		9.5	58 7.4	17.4		7.7	49.6	5.0	A
9.0	0.6	42.9	B	9.2	50.7	7.7		9.2	44.1	51.2		8.9	27.9	49.9	A	9.2	24 39.8	10.6	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	6ᵘ	+52°			6ᵘ—7ᵘ	+52°			7ᵘ	+52°			7ᵘ—8ᵘ	+52°			8ᵘ—9ᵘ	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	25 31.7	39.0	A	9.4	53 22.7	42.0		9.4	21 23.9	3.8		9.4	58 24.0	30.3	A	9.5	40 36.0	27.3	
9.4	33.3	31.7		8.8	22.9	23.3		9.5	59.4	37.3		7.5	59 43.8	33.0	A	9.1	41 24.3	12.7	A
9.3	26 20.5	50.8		8.9	45.8	51.9		8.4	23 14.8	14.3	A	8.7	0 4.3	12.5	A	6.8	42 34.7	54.3	A
9.5	29.1	33.5		9.2	54 7.0	4.3	A	8.2	24 15.8	30.4	L	8.2	22.0	27.1	A	9.5	56.6	7.0	
8.2	56.3	6.7		6.7	7.6	57.1	A	9.3	22.3	25.0	A	8.4	54.9	11.2	A	9.3	43 4.0	0.3	B
8.6	58.3	24.6	B	9.3	11.5	7.9	A	9.4	49.3	10.0	B	9.1	1 2.8	46.3		9.2	9.8	30.8	
9.1	27 34.0	32.2		9.4	23.1	12.2		8.5	25 59.9	30.9	A	9.5	2 22.5	59.1		9.3	44 14.1	12.7	
9.3	28 17.8	53.0		9.5	55 24.5	8.0		9.1	26 12.8	52.0	A	8.8	32.0	11.2	A	9.0	45 18.3	20.1	A
8.5	27.5	6.0		9.5	49.5	38.7		9.0	50.9	15.7	A	9.5	43.3	3.5		9.1	47 4.9	37.7	
8.6	53.7	55.7	B	8.8	59.6	1.7	A	8.0	27 5.2	24.4	A	9.1	3 49.3	32.1	A	9.3	21.8	28.9	
9.1	29 0.0	26.7		8.5	56 49.7	54.5	A	7.7	13.8	10.2	A	9.3	4 7.8	39.0	A	8.8	45.5	51.9	A
7.4	18.7	6.4	A	9.2	50.8	32.7		7.3	55.9	52.9	A	7.7	5 17.2	47.8	A	8.0	48 16.3	32.7	A
9.0	30 17.4	41.5		8.5	58 1.0	16.8	A	9.0	28 42.4	57.9	A	9.4	20.1	36.4	B	9.1	50 45.9	14.5	
9.1	31 5.9	53.7		9.5	9.2	33.0		9.3	29 23.3	17.6		9.3	6 5.0	49.3	A	9.5	51 51.0	19.8	
9.5	50.0	28.2		9.5	27.5	0.1		8.6	52.4	49.0	L	9.5	7.8	19.4		9.4	52.2	32.2	B
8.9	32 8.3	15.5		9.5	43.0	57.5		9.0	30 54.7	26.3	B	9.1	35.2	18.3		9.4	52.7	30.9	
9.1	39.7	2.2		9.4	52.4	14.7	A	9.2	59.5	25.0		9.4	7 19.1	2.0	A	8.5	52 25.1	45.5	A
8.4	33 0.1	52.8	A	9.5	59 7.6	49.7		8.0	31 10.6	37.8	A	9.2	8 6.3	55.6	A	8.2	27.8	50.4	A
9.4	41.6	33.8		8.9	0 7.0	32.1	A	9.3	21.6	4.1		9.2	9 32.5	39.6		9.0	53 33.8	9.7	
9.5	54.4	53.9		8.9	1 58.3	54.1	A	9.5	32 8.3	36.3		9.5	41.7	7.9		9.4	54 10.2	22.6	B
9.0	34 7.7	14.5		9.4	2 11.4	58.9	A	9.5	36.4	0.9		9.4	12 25.8	20.3	B	9.5	56 41.1	3.1	
8.5	26.0	22.4		9.5	32.1	16.7	B	8.5	41.8	59.3	A	9.5	26.0	30.3		7.3	56.8	12.7	A
9.5	53.5	20.3		9.5	37.5	6.2		9.3	33 1.9	56.9	B	8.5	13 0.6	0.1	B	9.5	58 17.3	41.1	
9.0	35 6.7	14.2	B	7.0	3 20.3	47.1	A	9.5	26.7	41.2		9.1	7.2	18.4		9.4	23.9	57.8	
9.5	16.3	57.7		9.0	4 4.2	8.2		9.5	34 14.3	4.8		9.1	14 47.5	42.8		5.0	37.8	11.8	A
9.4	36.6	58.5		7.7	5 12.3	17.6	A	9.3	35 2.4	46.6		9.4	15 22.1	1.8		9.3	59.0	26.6	
8.8	36 22.2	23.7		9.2	6 9.8	44.1		9.5	4.0	24.0		9.1	43.4	23.0	A	9.3	59.1	20.0	B
8.8	47.7	16.5		6.2	9.8	22.1	A	8.9	37 15.4	37.4	B	9.1	59.3	38.8		9.4	59 2.9	18.6	
9.0	37 29.0	54.0		9.0	25.8	12.6	B	8.0	50.3	51.5		9.5	16 35.8	49.2		8.9	40.9	2.9	A
8.5	36.5	38.0	B	9.3	40.2	2.5	A	9.2	57.8	1.2		9.5	17 6.3	13.4		8.9	49.2	0.6	A
9.0	50.5	7.7		9.3	7 25.3	57.2		8.8	38 4.3	3.1		9.5	58.5	52.2		8.0	58.7	58.7	S
9.0	39 26.8	19.9	A	8.0	8 6.8	12.2	A	8.7	6.7	8.8	L	8.8	18 14.0	6.1	A	9.5	0 41.2	40.1	
9.2	41.9	27.2		9.5	9 7.8	57.4		9.1	27.8	27.0		8.5	51.2	31.6	A	9.5	44.7	12.0	
9.3	40 9.8	6.7		8.7	18.0	4.5	A	8.3	32.9	59.3		9.4	19 35.5	39.9	B	9.1	3 11.4	8.4	
9.5	27.2	22.5		8.2	31.5	30.9	A	9.2	39 28.8	48.5		9.1	20 6.8	19.9		9.5	4 39.3	51.8	
8.0	30.6	8.5	A	8.6	10 13.5	30.4	A	9.2	41 29.2	17.6	A	9.3	7.1	11.0		9.3	6 1.7	11.3	
9.5	45.9	43.4		8.5	39.4	14.7	A	9.2	36.3	17.2	A	9.5	22.5	0.7		9.3	27.2	35.5	
8.5	52.8	40.5		9.2	46.3	32.8	A	9.5	41.0	4.7		9.5	21 34.3	21.9		9.2	8 17.8	1.2	
9.2	41 4.7	7.2		9.3	11 6.4	15.7	A	9.4	42 31.3	37.3		9.5	23 5.3	26.7		9.0	37.7	34.7	
8.2	18.5	50.3	L	7.8	50.4	32.4	A	8.7	43 52.8	9.2	A	9.3	10.2	21.8	A	8.2	9 3.1	14.3	B
8.8	41.0	38.5		9.3	12 22.3	51.0		9.5	44 58.4	18.2		9.3	24 19.8	20.9	A	9.2	11 9.2	49.4	
9.5	42 4.7	23.7		9.5	13 9.6	4.4		9.5	46 14.6	11.3		7.5	28.5	41.2	A	9.4	12.2	34.2	A
9.0	17.2	41.6		8.9	10.3	58.8	A	9.5	48 14.5	32.7		9.5	25 9.4	48.4		9.5	12 29.1	20.0	
9.5	43 49.1	42.0		9.1	28.3	39.7	A	9.4	49 3.3	24.0		9.1	30.8	40.1	A	9.5	13 2.8	21.4	
9.2	44 19.6	35.6		6.1	37.8	9.8	B	9.5	21.8	31.4		7.7	27 1.7	32.6	A	9.3	21.4	13.0	
9.0	38.5	25.2		9.4	52.7	38.7		9.5	28.9	39.7		9.3	40.5	10.9		9.4	14 3.0	40.1	
9.4	45 15.4	5.8		9.5	14 17.8	48.0		9.2	37.7	49.0		9.2	29 35.3	17.9	B	9.4	22.5	13.6	
9.1	24.3	46.4		9.1	31.9	58.8	A	8.9	46.1	6.1	A	9.5	38.8	6.0		9.2	35.7	38.6	
9.2	46 8.7	26.3	A	9.5	15 12.7	9.2		9.4	51 2.9	4.1	R	7.8	45.4	16.0	A	6.7	52.3	12.0	G
7.7	47 14.9	3.1	A	9.3	16.1	13.7		9.0	28.2	17.7		8.7	31 2.2	33.7	A	9.0	15 14.3	22.3	
9.5	48 5.7	15.9		9.5	43.3	56.9		9.3	53 28.8	11.6		9.5	32 21.0	6.8		9.5	25.4	10.7	
6.8	13.9	44.4	A	8.7	16 29.3	38.2	A	8.9	48.9	33.3	A	8.5	33 30.3	56.8	A	9.5	56.0	46.4	
9.4	37.1	9.9		9.4	50.9	14.3		9.1	54 31.3	58.3	R	9.1	34 22.5	42.1		9.5	17 29.1	19.5	
9.5	49 51.8	14.8		9.5	17 49.3	47.6		9.3	32.4	45.1		9.3	35 43.3	22.0		9.5	18 4.3	25.2	
9.4	50 23.9	54.2		9.5	18 55.6	34.8		9.4	58.4	5.1		9.1	36 1.6	4.1	B	8.9	19 30.7	10.7	A
9.5	51 1.7	28.7		9.0	19 25.2	17.3	A	9.2	55 3.3	15.4		9.3	56.8	47.7		9.5	40.5	2.5	
9.5	52 4.9	51.3		7.0	39.3	16.7	A	9.2	23.2	32.2	B	9.0	37 24.0	39.2	B	9.0	20 14.2	49.2	A
9.4	40.4	7.6		9.3	54.2	14.6	A	8.8	56 11.3	24.0	A	9.3	39 11.9	52.3		9.3	56.8	28.7	
9.0	53 1.0	5.8		8.7	20 5.8	55.9	B	8.7	31.8	39.7	A	9.1	15.5	2.2		9.2	22 14.2	16.0	
9.0	21.8	57.0		9.0	21 13.7	55.4	A	9.3	57 42.3	15.3	B	9.3	28.2	11.6		9.5	52.2	46.9	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	9ʰ—10ʰ	+52°			10ʰ	+52°			10ʰ—11ʰ	+52°			11ʰ—12ʰ	+52°			12ʰ—13ʰ	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
3.0	23 6.7	20.8	S	7.3	3 35.3	12.7	A	9.0	45 34.0	5.4		8.3	33 41.9	48.2	A	8.9	31 27.1	7.2	A
5.0	24 52.6	42.5	A	9.1	4 36.3	1.8	A	7.8	46 20.1	53.6	S	8.3	35 13.4	43.9	A	9.5	58.7	22.4	
9.0	55.0	3.2		9.3	5 15.5	33.3	A	9.5	35.0	22.7		8.9	36 4.4	47.2	A	9.5	32 44.2	14.5	
9.5	25 38.3	18.5		9.3	16.6	13.7		9.5	47 11.3	44.3		9.5	19.3	18.5	B	7.8	33 5.9	31.7	A
9.5	26 30.0	57.2		9.5	43.7	7.3		9.5	34.2	31.1		9.3	37 3.9	56.0		8.9	10.7	23.1	B
9.5	27 30.3	3.1		9.5	46.4	19.6		7.5	48 7.0	58.0	A	9.2	38 13.3	25.1		8.3	48.1	16.5	A
9.5	28 39.2	8.2	B	9.0	6 21.4	50.1		7.8	49 22.0	14.8	G	7.5	40.8	43.9	L	9.5	35 53.2	7.6	
8.0	29 12.6	58.7	B	9.4	7 35.9	53.9		6.0	50 42.0	39.9	A	9.3	39 18.5	49.8		9.5	37 5.2	32.1	
9.5	30 9.0	39.6		9.4	8 11.4	9.8		6.3	51 52.6	15.8	A	9.4	42 50.5	14.4		9.2	6.5	10.2	A
9.1	10.6	11.4	A	8.0	49.8	31.4	A	9.2	55.9	12.7	A	7.3	43 11.9	12.9	A	7.2	39.2	33.6	B
9.3	57.3	0.4	A	9.5	9 8.9	41.6		9.5	52 16.1	51.2		8.7	44 6.3	47.9	A	9.0	38 30.1	32.2	A
9.5	31 23.8	0.8		9.5	28.0	23.0		9.3	38.0	56.0		9.5	13.9	12.9		9.3	39 7.6	17.0	A
8.2	33.2	46.9	A	6.7	45.9	7.7	A	9.0	56.2	58.2		9.5	45 38.4	32.5		9.5	40 1.2	14.5	
9.5	40.1	21.5		9.5	11 59.9	50.5		9.3	53 8.3	49.6		9.5	47 2.2	42.3		7.4	10.1	23.7	A
9.0	34 42.2	1.5		8.5	12 59.0	10.9	A	9.5	57 18.6	15.2		8.3	26.5	45.4	A	9.5	41 46.5	57.8	
8.8	51.7	2.9		9.5	13 46.0	2.1		9.0	22.2	38.2	B	9.5	48 38.4	42.4		9.0	43 7.6	19.5	A
8.6	35 2.7	43.0	A	9.0	14 50.5	39.5	A	9.1	43.0	28.9		9.3	49 25.8	52.8		9.5	13.3	17.5	
9.1	33.5	11.1		9.0	16 9.6	54.1	A	9.5	47.7	8.1	B	9.5	51 47.3	46.3		9.1	45 15.7	4.4	
9.0	53.3	33.2	A	9.3	37.8	5.5		8.6	58.7	9.1	A	9.3	52 21.7	41.4	B	8.8	16.2	38.6	A
9.5	36 27.8	52.8		9.5	57.0	12.8		8.3	58 36.6	3.2	A	8.9	22.7	24.3	A	9.1	51.0	1.6	
9.5	38 28.3	31.7		9.4	18 37.1	42.0	B	7.2	0 54.6	9.8	A	8.5	29.3	34.9	A	9.5	48 4.7	33.6	
9.4	51.7	57.2		9.5	47.2	40.4		9.1	1 4.1	19.1		9.5	53 1.4	43.8		9.3	15.2	21.4	
9.5	39 42.3	42.5		9.5	19 47.9	26.1		9.2	12.4	17.1		8.4	54 52.1	8.9	A	9.3	50 19.4	49.8	
8.0	40 23.5	5.0	B	8.0	21 0.3	59.9	A	9.3	2 21.5	34.2		9.5	55 57.1	7.9		9.5	46.2	19.5	
9.1	24.7	53.3		9.3	20.9	10.3		8.5	3 28.8	53.4	A	9.5	56 56.3	29.1		9.5	51 49.0	3.5	
8.5	41 17.1	42.0		8.7	38.5	8.6	B	9.5	46.4	24.0		9.4	57 35.0	0.7		9.5	53 16.7	9.6	
8.5	42 17.7	16.0		8.3	22 1.7	33.5	A	9.5	4 53.9	11.2		8.6	36.8	3.0	A	9.5	21.6	29.3	
8.8	43 59.0	40.6		9.5	23 10.4	2.9		9.5	5 12.3	50.6		7.2	58 12.0	44.4	S	9.0	54 13.6	12.0	
9.2	44 47.8	40.6		8.3	35.0	35.0	A	9.5	48.4	54.0		9.0	59 30.0	33.2		9.5	56 28.8	26.8	
9.5	45 55.8	9.0	B	9.5	24 0.7	6.5		9.1	6 11.4	26.4		9.2	0 11.0	48.9		9.4	35.2	36.2	
7.2	46 26.9	57.3	A	8.5	25 42.0	53.6	A	9.5	54.4	0.8		9.0	1 0.3	4.7	A	8.3	47.7	29.3	A
9.3	47 13.3	42.6		9.4	58.0	36.5		9.5	8 33.7	49.0		9.5	28.9	13.6		9.3	57 56.2	24.8	
9.5	48 23.1	1.0		9.5	26 4.4	30.1		9.5	9 53.6	47.5		8.5	2 45.5	7.4	A	9.0	0 33.7	47.5	
9.0	35.6	49.0		9.3	20.6	51.7		8.4	10 44.6	5.8	A	7.5	3 34.4	36.6	A	9.1	35.5	1.2	A
9.4	39.9	6.3	B	9.0	27 0.3	4.2	A	9.3	11 12.0	39.8		9.5	44.6	40.0		9.5	56.6	31.2	
8.0	44.4	15.6	F	6.9	18.0	51.6	A	9.3	17.5	14.6		9.1	4 43.4	19.9		7.5	1 29.2	34.1	A
9.3	49 3.5	8.9	B	9.5	28 16.3	40.5		9.5	42.8	44.0		8.0	5 30.5	44.9	B	9.1	3 7.6	7.1	
8.0	13.7	45.6	B	9.3	38.7	18.4		7.2	12 47.6	33.4	A	8.7	6 2.2	7.0		8.1	18.8	56.0	A
8.8	30.9	33.9		9.5	29 28.3	2.6		9.1	14 7.6	21.1		8.3	7 19.0	48.0		9.0	23.9	36.4	
9.3	50 18.6	54.9		9.5	28.7	44.2		8.0	15 27.1	15.6	A	9.5	54.4	40.5		9.4	25.0	7.0	
9.4	48.9	36.8		9.3	32.6	11.2	B	7.3	39.5	50.1	A	9.5	9 33.5	50.0		9.1	4 10.1	24.3	A
8.2	51 27.8	36.8	F	9.4	46.4	15.7	B	9.2	16 22.3	48.0	A	9.4	12 31.2	23.3	B	9.1	5 16.2	41.3	
9.5	51.9	1.9		9.3	32 26.6	11.4		7.2	17 48.6	54.5	A	9.4	34.2	17.0	B	9.3	31.8	23.1	
9.4	57.3	21.0		9.0	57.0	22.1	A	9.4	19 3.0	42.4		9.5	14 49.7	9.6		9.5	32.5	0.5	
9.0	52 15.4	49.5	A	9.4	33 26.5	26.1	A	9.5	9.6	12.2		9.3	16 20.8	57.7	A	7.1	6 38.7	40.2	B
8.9	24.9	32.3	A	9.5	34 4.6	46.3		9.5	20 4.9	9.0		5.2	17 0.2	20.5	A	8.8	8 16.9	22.7	
9.2	53 7.4	45.1	A	9.5	15.7	3.9		9.5	45.3	18.0	B	9.4	18 24.3	3.1		9.5	10 22.5	51.1	
9.5	54 42.3	58.9		9.5	17.2	26.6		8.7	23 2.4	7.6	A	9.4	19 17.2	8.7	A	9.2	11 21.4	59.0	
9.0	55 25.8	14.4	A	9.2	36 20.5	53.6		9.5	45.9	50.3		9.5	21 18.3	51.8		8.8	27.1	10.2	
7.7	56 8.3	6.4	A	9.0	37 58.0	33.5	A	8.5	24 55.8	33.5	A	8.7	22 54.9	22.8	A	9.0	31.4	7.4	
9.5	22.3	36.8		9.3	39 9.0	34.0	A	9.5	25 47.4	11.5		6.5	23 13.2	20.0	A	8.4	12 3.7	15	
9.5	57 30.3	40.1		9.5	40 15.7	9.2		9.4	26 9.9	28.9	B	9.0	15.2	49.8	A	9.5	51.1	[illegible]	
9.2	33.3	52.4	A	8.4	41 28.0	1.2	A	8.5	40.3	32.1	A	8.7	36.4	3.1		9.5	13 9.7	[illegible]	
9.4	42.7	10.0	A	8.1	59.2	34.5	A	8.0	46.8	47.2	A	8.7	26 38.3	2.5	B	9.5	14 26.8		
9.3	47.4	19.6	A	9.5	42 12.6	24.7		9.0	29 23.9	26.1		9.0	49.5	2.6	B	9.5	31.6		
9.4	58 15.9	15.6		9.2	46.0	45.3	A	8.8	30 7.9	51.6	A	9.5	27 52.7	33.2		9.5	15 47		
9.5	59 4.8	2.4		9.0	56.0	50.7	A	9.5	54.5	5.8		7.7	28 5.7	10.0	A	9.5	16 [illegible]		
9.4	27.0	28.9		9.5	43 50.2	35.4		7.8	31 31.8	59.5	A	8.0	29 1.6	2.5	A	7.7	[illegible]		
9.5	1 49.3	29.4		6.5	57.0	49.8	A	9.4	32 56.0	48.8		8.0	28.0	18.9	A	9.4	17 [illegible]		
9.4	56.1	11.3		9.5	45 28.6	26.2		9.1	33 7.9	34.0		9.5	30 45.6	25.9	B	9.4			

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	13h	+52°			13h—14h	+52°			14h—15h	+52°			15h—16h	+52°			16h	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	18 22.9	33.1		8.9	54 29.0	53.0	A	7.2	36 48.3	0.5	S	9.3	29 42.7	24.7		9.0	2 35.5	43.3	A
9.5	39.7	20.8		8.8	48.2	45.5		7.0	37 17.2	37.5	A	9.2	30 20.0	1.2		9.4	45.3	29.1	A
9.5	19 53.7	48.8		9.5	55 13.9	22.4		9.5	52.0	59.8		8.7	38.3	0.3	A	9.2	4 17.0	43.3	A
9.3	22 19.3	54.6		9.5	57.1	53.4		9.4	38 11.9	41.9		9.5	31 2.0	54.0		8.5	45.2	2.4	A
9.2	28.5	10.9	A	9.5	56 39.9	36.8	B	8.0	39.2	32.5	A	9.4	46.2	13.2		9.3	5 20.1	30.1	
8.7	32.2	38.0	A	9.4	57 29.5	13.5		8.4	41 14.0	14.2	B	6.0	32 0.4	32.8	B	9.5	6 46.8	7.2	
9.5	23 27.6	34.5		9.4	58 23.9	6.7		9.0	42.7	10.4		9.4	18.7	21.6		9.4	7 1.6	9.0	
9.5	33.0	42.5		8.5	57.2	8.9	A	9.3	49.7	11.2		9.2	33 57.7	56.4		8.5	1.7	31.0	A
9.5	38.4	8.7		8.9	59 14.7	2.3	A	8.9	43 46.2	3.3	J	9.3	34 28.1	1.5	A	8.9	8 51.2	8.1	
9.0	24 23.7	18.8		9.5	0 16.5	38.6		9.4	51.1	4.5		8.1	47.7	1.8	A	9.3	53.8	31.0	
8.3	26 47.3	46.8	A	9.5	17.2	12.5		9.5	46 0.4	28.1		9.5	56.8	8.6		9.0	10 30.0	20.1	A
9.5	59.6	5.0		9.5	36.3	30.2		8.1	6.3	7.8	B	9.5	58.3	36.9		8.8	11 33.5	23.5	A
9.4	28 15.7	34.5		9.5	1 3.3	42.1		9.1	47 2.0	57.9	A	9.4	36 31.2	20.7		9.5	56.8	4.3	
9.4	25.2	38.5		9.5	30.2	49.5		8.6	49 32.7	53.3	A	9.3	31.9	9.3	B	9.1	12 37.0	2.5	
8.5	29.1	40.9	A	8.0	48.5	54.0	A	9.5	42.5	34.1		9.0	55.1	22.5	A	9.0	57.0	57.6	
9.5	53.4	32.6		8.3	3 11.5	16.8		8.3	50 10.0	20.4	B	8.9	37 30.5	35.7	B	8.5	13 38.5	43.8	
9.5	29 21.5	53.6		7.7	4 49.0	54.9	A	9.5	12.3	39.0		9.5	38 0.2	30.5		9.5	15 51.5	42.8	
7.3	30 49.0	1.1	A	8.5	59.3	47.0	B	9.0	53 7.4	9.9		5.0	53.5	50.2	A	9.4	57.8	1.3	
9.3	54.3	6.2		9.0	5 20.8	42.1	A	8.5	15.8	31.1	A	9.5	40 1.7	27.0		9.1	16 9.4	6.2	
9.5	58.4	47.3		9.5	22.0	53.9		8.6	54 24.7	45.9		9.2	13.7	40.4		6.8	44.5	23.1	A
9.3	31 32.6	16.4		9.4	6 36.8	37.5		9.4	54.6	27.3	B	9.2	46.9	45.3	A	8.0	50.6	11.2	A
9.4	46.8	40.9		4.5	8 17.5	27.3	A	8.8	56 24.3	58.2		9.5	41 18.6	17.7		9.0	17 58.8	26.1	A
9.5	32 24.7	0.1		9.0	10 57.0	44.8	B	9.4	57 16.5	3.2		7.5	42 27.6	36.4	A	9.5	19 11.4	31.7	
9.4	55.2	20.2	B	4.5	11 3.5	2.3	A	7.3	58 1.2	12.0	A	9.4	58.0	22.8	B	6.5	20 50.0	37.4	A
6.8	33 31.6	32.1	G	8.5	5.5	2.9	A	9.4	30.8	26.4		7.8	58.5	26.0	A	6.9	21 20.2	3.6	A
9.3	35 31.6	48.3		9.3	51.8	48.6		8.8	44.2	43.6		8.5	43 3.8	2.3		9.3	22 18.1	18.2	
9.5	36.7	10.9		7.0	12 40.0	31.6	B	9.5	59 5.3	27.4		8.3	20.7	31.4	A	9.4	30.2	37.8	B
9.2	37.1	33.5	A	7.3	13 27.2	43.1	F	9.5	26.4	33.8		9.4	30.0	18.1		7.2	25 4.4	5.0	A
9.5	37 30.0	28.2		9.5	57.7	13.2		8.8	0 42.7	35.2	A	9.4	46 10.5	3.3		9.3	26 8.7	22.1	
9.5	38 3.3	9.7		9.5	14 26.8	56.7		8.3	2 12.8	51.0	A	8.0	30.8	12.2	A	9.3	27 50.6	15.2	
8.9	7.7	11.9	B	9.4	31.3	36.7		9.4	45.7	20.0		8.4	59.2	40.7	A	9.4	28 29.4	9.3	
9.5	8.1	10.8		8.5	15 20.8	21.4		8.3	3 7.8	48.6	A	8.6	47 49.1	1.6		9.4	51.1	18.9	B
6.2	16.2	46.3	A	8.0	23.2	51.4	F	9.0	17.0	44.6	A	8.6	48 9.1	59.9	B	9.5	57.3	21.4	B
9.4	30.2	40.9		8.9	53.2	15.0		9.5	39.5	45.1		9.2	49 2.7	25.0		9.5	29 43.4	30.0	
9.5	54.7	20.3		9.5	16 15.3	41.6		9.1	50.1	24.0		9.3	11.0	44.9		9.3	30 13.6	16.2	
9.3	55.7	31.0	A	9.5	18 13.2	10.3		9.3	4 12.3	56.4	A	9.2	30.1	40.8		7.0	26.1	31.9	A
9.5	39 34.6	59.1		9.5	32.5	27.4		8.3	5 16.5	14.0	B	9.5	50 5.7	53.1		9.4	48.0	40.6	
9.5	41.0	4.2		9.3	34.3	44.6		8.0	32.1	58.3	A	9.0	51 9.2	50.1	A	9.2	31 11.9	46.1	B
8.6	40 50.4	42.9		9.5	51.8	51.5		9.0	7 18.8	9.4		9.5	47.3	18.6		8.8	26.6	3.3	
9.4	42 1.5	17.6		9.2	19 14.0	6.0	A	8.7	9 52.5	0.3		9.3	52 12.5	39.3		9.3	39.5	12.7	
9.2	23.6	9.3		9.1	16.8	49.6		9.4	10 22.2	19.2		9.5	53 30.4	33.3		9.5	54.6	25.1	
9.5	39.6	38.0		9.4	41.5	8.6		9.4	43.4	55.2	A	9.3	38.8	49.2		9.0	55.0	35.5	B
9.2	43 3.0	24.8		8.9	53.8	47.6	A	8.7	11 29.7	48.3	A	9.2	54 39.1	22.0		7.8	33 14.2	32.5	A
8.9	36.1	12.5	A	4.0	20 16.7	31.3	A	9.5	12 25.3	43.8		8.5	55 25.2	8.2		9.5	34 14.5	48.5	
9.5	45 1.0	19.8		9.3	22 33.7	48.8	B	8.2	13 49.7	9.2	A	9.4	45.5	54.1		9.3	37.6	44.1	
9.4	9.3	39.6		9.5	39.5	43.1	B	9.4	14 19.2	30.9		9.2	59.0	8.3		9.5	35 44.6	53.9	
8.8	46 21.5	19.4		9.5	25 36.3	13.5		8.5	15 34.2	48.8	G	9.1	56 5.3	1.4		9.4	37 44.7	44.0	
9.4	46.6	44.4		9.3	26 21.0	57.5		8.9	40.5	48.3		9.0	47.2	21.2		9.5	45.7	19.8	
9.4	49.0	52.0	B	9.2	43.8	42.1		5.5	48.7	30.5	J	8.3	57 33.0	31.5	A	9.5	38 2.0	41.4	
9.5	47 18.0	18.9		9.5	27 24.8	11.5		9.5	16 35.8	2.2		9.3	59 8.1	37.9	A	9.4	30.9	18.9	B
7.2	48 3.6	49.7	B	8.5	29 53.7	41.1		9.3	48.7	46.3		9.3	27.9	0.4		9.5	58.1	32.2	
9.3	52.2	1.8		9.3	30 19.8	22.4		9.5	17 13.8	41.3		8.9	48.7	38.4	A	9.4	39 45.9	3.1	
9.0	49 6.8	1.3		9.5	31 35.8	20.0		7.0	15.2	52.1	G	9.1	0 22.3	11.2		8.8	40 8.1	47.0	A
9.4	13.0	46.9		9.5	32 20.9	52.5		8.0	18 38.2	40.4	G	8.9	34.5	31.5	A	8.0	29.0	11.0	L
9.5	50 32.0	13.5		7.5	58.8	39.7		8.2	20 33.5	10.8		9.1	1 9.5	26.6	A	9.5	42 26.0	21.3	
9.5	51 44.6	16.4		6.8	33 12.4	12.0	A	7.0	22 17.9	33.6	B	9.3	36.8	28.0		9.5	43 51.7	34.1	
8.4	52 11.6	42.1	B	8.5	34.3	25.4	A	8.8	23 42.0	4.9	A	9.2	37.8	30.2	B	8.9	46 8.8	54.4	
9.5	23.2	40.6		9.5	35 22.5	53.5		9.0	24 5.3	13.1	A	9.4	58.0	23.6	A	9.2	10.5	39.2	B
9.0	59.4	3.7		6.8	36 19.2	52.5	A	9.0	28 33.3	48.8	A	9.4	2 21.0	28.5	A	9.5	35.1	32.2	
7.8	54 18.8	51.9	A	9.1	38.6	7.3		9.2	52.2	50.6	A	9.5	23.0	13.2		9.3	44.5	4.8	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	16ᵘ—17ᵘ	+52°			17ᵘ	+52°			17ᵘ—18ᵘ	+52°			18ᵘ	+52°			18ᵘ	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	46 51.5	24.2	B	8.9	24 42.1	8.3	A	8.8	55 57.8	1.9		8.8	15 0.2	10.2		9.5	31 47.6	32.7	
8.8	47 10.2	25.2	A	9.2	26 5.2	33.4		8.8	56 50.3	40.4	B	9.5	10.4	3.6		9.5	51.3	26.8	
9.3	14.8	16.4		9.4	5.9	12.0	B	9.5	53.2	0.7		9.5	43.6	46.3		8.9	54.9	48.7	
9.3	30.9	36.1		9.3	10.8	39.4		9.5	57 1.1	11.8		7.5	16 6.2	35.8	A	9.5	32 0.7	13.2	
9.1	48 41.9	2.8		3.0	27 10.8	23.5	G	7.2	10.2	51.4	S	9.3	14.6	40.8		9.5	48.7	42.1	
9.5	56.8	36.1		8.1	29 0.7	42.2	A	9.4	17.0	19.1		9.0	35.0	46.5	A	9.3	51.3	55.1	
9.5	49 31.2	26.3		8.0	14.3	11.6	A	9.5	22.3	14.0		9.3	42.6	30.6		9.4	33 5.5	38.6	
8.0	51 28.0	11.9	A	9.3	55.4	30.6	B	9.5	24.0	7.1		9.5	49.5	24.4		9.5	20.0	41.1	
6.8	52 56.6	55.9	L	9.5	30 10.9	4.6		9.4	43.4	10.6		9.0	52.1	50.4		9.3	26.3	58.3	
9.5	53 21.1	46.5		9.5	11.3	22.0		9.5	53.7	8.2		8.9	17 4.3	36.8	A	8.8	34.7	49.6	
9.5	28.3	27.4		9.3	31 26.0	31.9		9.5	58 59.5	52.3		9.5	34.0	29.9		9.5	34 5.2	30.2	
7.7	42.9	5.9	A	9.0	27.1	48.8		8.4	59 0.8	0.2		9.1	47.2	20.5		9.1	9.1	51.9	
9.1	54 19.6	58.9		9.1	43.8	5.4	B	8.6	52.2	34.9	A	8.9	18 5.9	7.2	A	9.4	14.8	48.2	
8.6	37.3	0.7	A	9.4	56.7	5.3	B	7.9	59.1	51.0	A	7.3	24.0	49.8		9.5	18.0	50.6	
9.1	53.0	55.4		8.8	57.7	14.5		8.5	0 21.5	35.8	A	9.0	37.4	38.9		9.5	46.2	50.4	
8.3	55 34.1	31.3	L	9.5	32 29.5	42.5		9.5	25.4	4.9		9.5	47.5	15.3		9.4	35 13.1	36.9	
9.2	56 55.1	38.7		9.5	50.4	13.4		9.5	1 22.0	51.0		9.0	48.8	18.0		9.0	28.3	35.3	
6.8	57 55.0	48.1	A	8.0	55.3	33.9	A	9.5	31.9	12.0		9.0	48.8	16.5		6.8	33.7	12.3	A
7.5	58 43.9	8.6	A	8.6	33 26.9	40.3	A	8.5	2 21.1	0.2	A	8.6	52.6	8.5	A	9.5	36 15.4	58.5	
9.1	58.4	10.9		9.4	34 10.1	2.0		8.9	27.2	49.7		9.5	19 4.2	17.9		7.8	17.5	48.6	A
9.3	0 47.0	32.1		9.3	23.0	45.4		9.0	46.6	19.5		9.5	10.0	50.8		9.5	23.9	19.3	
8.3	1 5.0	20.9		9.2	48.4	40.8		9.5	3 16.3	36.8		9.3	20.1	44.9		9.5	31.5	34.1	
9.3	38.9	33.5		8.8	58.1	41.5	A	9.5	37.5	36.8		9.5	20 10.2	44.7		5.7	33.9	3.8	A
8.0	56.7	23.3	A	9.2	35 16.8	4.0		9.5	4 16.5	47.4		9.5	20.9	28.2		9.5	37 10.7	7.7	
8.5	2 1.7	33.0	B	9.5	36 13.0	59.2		9.5	34.5	8.6		9.4	53.0	7.3		9.4	35.1	59.1	
8.4	32.5	13.4	A	9.5	55.1	33.3		8.7	36.2	53.0		8.6	56.9	58.6		9.4	45.9	8.1	
9.3	4 4.8	52.4	B	9.2	37 23.3	3.0		9.3	5 18.8	59.7		9.5	21 1.7	19.0		9.1	38 4.2	22.2	
8.8	38.5	30.3	A	9.3	38 4.8	4.6		9.5	20.0	25.0		9.1	22 5.9	15.3		8.8	13.2	27.3	R
9.3	5 34.0	49.1	B	7.9	57.0	7.3	A	9.5	33.7	10.1		8.7	52.8	10.3		9.5	21.8	32.6	
9.3	57.7	55.2	B	9.2	39 2.5	30.9		9.5	6 5.0	16.8		9.5	53.5	37.7		9.3	24.2	36.2	
9.5	6 33.5	6.8		9.1	12.2	12.5		9.5	32.6	22.8		9.4	23 7.9	28.8		9.5	39 7.8	29.0	
6.0	7 12.8	35.2	L	9.3	40 14.3	9.0		9.3	39.7	42.4		8.6	12.2	39.2		9.3	11.9	26.7	
9.0	55.9	7.8		9.3	25.0	0.6		9.2	7 7.0	32.8		9.1	17.1	57.2	B	9.3	36.9	49.7	
9.0	8 44.5	12.9		9.0	58.6	48.3		9.5	30.8	41.2		8.4	37.9	59.6	R	9.5	44.5	35.7	
9.2	9 38.5	2.9		9.3	41 11.4	18.5	B	9.2	32.7	28.0		9.4	49.9	58.4		9.0	41 52.2	46.7	R
8.9	10 14.9	4.9		9.5	22.8	58.0		9.5	36.7	29.9		9.3	24 58.1	50.0		9.5	42 43.7	1.5	
8.3	19.0	27.8	A	8.3	51.6	0.3	A	9.5	8 16.4	30.1		8.4	25 14.9	20.8	A	9.4	43 5.2	28.2	R
9.3	45.6	12.4		7.5	42 54.9	32.3	A	7.4	41.2	16.7	L	9.2	34.7	57.3		9.5	8.4	8.8	
9.0	49.7	48.5	A	9.5	44 51.0	13.5		8.4	55.4	1.6	A	9.5	39.6	55.7		8.9	26.5	24.3	R
9.5	12 8.8	1.3		9.5	45 41.3	32.4		9.2	9 3.3	4.9		9.4	51.4	42.2		6.3	29.7	49.2	A
9.2	13.6	33.2		9.5	46 47.2	36.4		7.3	4.9	41.4	L	9.4	26 39.4	31.5	B	9.5	59.2	26.3	
9.5	52.9	15.6		9.4	47 7.3	13.0		9.1	6.0	37.8		9.5	42.8	56.0		9.5	45 3.8	53.6	
7.5	13 22.0	56.4	L	9.5	34.9	1.3		9.5	13.5	41.1		9.5	27 15.6	31.8		9.2	54.4	30.7	R
8.9	14 15.8	59.4		9.5	39.5	38.4		9.2	59.7	25.5		9.5	49.2	56.1		9.5	46 10.4	21.2	
7.8	32.1	37.1	L	9.5	48 35.2	3.8		8.9	10 2.4	22.5		8.4	28 5.1	20.3	B	9.5	46.9	51.1	
7.8	42.6	29.3	L	9.4	49.8	7.7		9.0	4.4	39.8	B	9.4	9.4	9.4		9.5	52.5	36.1	
7.9	16 32.5	1.6	A	9.4	55.0	34.5		8.6	13.9	27.4	A	9.4	15.0	16.4		9.2	47 1.6	2.0	
9.0	52.6	14.4		9.1	49 0.6	43.3		9.5	18.0	59.7		9.1	16.8	59.1	A	9.0	28.5	40.6	A
9.0	17 33.0	16.5	B	9.5	33.0	44.3		9.4	31.0	34.4		9.2	18.9	22.9		9.1	45.4	40.6	A
9.3	18 1.1	15.5		8.0	50 13.9	24.5	A	8.3	38.2	28.9	A	9.2	31.4	46.6	A	8.9	51.6	8.8	R
9.5	17.6	40.1		9.1	14.8	48.4		9.3	39.3	29.5	A	8.8	34.9	34.7	A	9.5	52.0	26	
9.3	19 59.7	17.9		9.5	52.2	46.9		9.2	40.0	27.6		6.5	52.9	0.8	G	9.5	48 1.5	2	
9.5	20 0.5	34.5		9.5	51 33.2	58.3		9.1	51.6	38.0	B	9.2	29 19.9	21.3		9.5	14.6		
9.5	1.2	35.0		9.4	53 23.1	15.5		7.8	11 27.4	30.3	A	7.8	32.4	17.8	A	5.5	21.4		
9.5	31.3	1.3		8.7	28.8	25.5	B	8.2	55.2	6.9	A	9.4	30 11.7	53.6		7.7	39.		
9.5	21 2.6	6.1		9.3	39.5	21.5		9.0	12 12.5	48.5		8.3	20.7	46.6	F	9.0	49 18.		
6.5	22 13.3	54.7	A	9.5	54 12.4	15.0		9.5	30.6	57.7		8.6	37.0	14.6	A	9.5	50 16		
8.1	23 44.2	0.0	A	9.1	25.5	21.6	B	8.0	13 5.0	50.4	A	5.5	40.2	14.6	A	9.3	2		
8.7	45.1	6.7		6.8	50.4	13.5	A	8.3	40.4	1.2		9.5	31 11.9	32.7		9.4	5		
9.5	24 17.3	11.1		9.5	55 50.9	50.3		9.5	14 54.5	41.8		9.4	37.5	49.2		9.2	5		

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	18ʰ—19ʰ	+52°			19ʰ	+52°			19ʰ	+52°			19ʰ	+52°			19ʰ	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.6	51 10.6	30.3	L	9.5	7 25.4	52.5		9.3	21 21.2	52.3	A	8.8	36 37.7	3.2	B	9.5	45 43.1	14.4	
8.7	34.0	59.5	R	8.8	57.5	51.6		9.4	37.5	53.4	A	9.5	45.4	9.9		9.5	59.7	58.1	
9.5	58.4	37.1		9.5	8 2.7	17.2		9.5	44.1	39.4		8.9	37 44.3	16.0		9.0	46 5.4	56.6	
9.3	52 20.0	23.2		9.5	16.9	38.7		9.3	44.6	55.4	A	9.2	45.3	26.1		9.2	7.3	51.0	
9.0	27.1	28.9		8.2	22.7	23.4	L	8.8	58.5	6.9	L	9.4	53.8	51.0		9.5	37.9	3.4	
9.5	34.9	40.6		9.5	9 16.0	58.4		9.5	22 37.0	9.4		8.9	38 4.0	32.8		9.5	43.3	54.3	
9.1	53 13.0	59.2		9.5	17.0	56.1		9.5	23 4.9	20.4		9.5	29.8	53.7		5.3	59.0	37.3	A
9.5	28.7	15.8		9.5	17.0	52.7		9.4	14.4	22.9		9.5	31.0	21.4		9.3	47 0.2	0.0	
9.5	54 15.5	40.6		9.3	40.0	45.9		9.5	34.2	54.5		9.2	38.0	58.7		9.0	10.6	12.9	
9.3	28.6	2.6		9.5	10 1.9	16.9		9.1	34.7	9.6		9.4	44.4	58.1		9.5	12.3	48.1	
8.8	45.9	30.7	A	8.0	20.8	57.5	G	8.3	35.6	30.5	A	9.5	48.6	35.3		9.5	29.5	35.1	
9.2	55 8.6	53.8	A	9.5	32.3	45.6		9.3	40.5	43.2		9.5	55.1	38.4		9.5	41.0	7.8	
9.1	17.5	55.6		9.0	34.4	24.4		9.1	50.8	17.0		9.5	39 22.5	27.8		9.5	43.8	56.5	
9.4	25.5	54.5		9.5	42.7	46.2		6.1	52.6	1.6	G	9.4	32.6	14.3		9.2	48 6.3	26.8	
9.1	27.0	0.5		9.5	11 2.8	17.3		8.8	24 23.3	31.0		9.1	35.7	38.7		8.4	33.3	51.1	A
9.1	31.0	55.2	A	8.3	10.4	36.9		8.7	28.0	52.3	A	9.0	35.9	59.1		9.5	40.1	33.7	
9.0	46.1	52.8	A	9.5	14.1	0.2		8.0	39.1	27.8	A	7.1	38.5	12.6	G	9.4	40.9	34.5	
9.5	56 24.5	21.3		9.5	23.3	18.7		9.5	25 57.4	37.8		9.5	48.6	17.5		8.9	52.5	58.9	A
9.5	57 9.3	32.2		9.4	52.5	2.8		9.2	26 14.2	46.0		9.4	51.4	54.4		9.0	55.2	50.3	A
8.4	11.6	3.7	L	9.2	59.0	40.4		8.5	23.1	16.2	A	9.4	40 10.3	11.0		9.5	49 3.5	45.4	
8.9	42.3	57.8		9.1	12 8.4	43.5		8.5	55.4	48.2		7.4	10.8	15.9	G	9.5	26.5	40.0	
9.5	44.9	37.7		9.2	25.9	20.5		8.8	27 2.4	18.5	A	8.9	13.4	14.0		9.5	37.6	4.7	
9.2	58 27.1	36.1	A	9.5	13 28.2	31.1		9.1	5.5	21.2	B	9.5	15.7	47.0		9.1	49.3	7.2	
9.3	30.8	20.3		9.2	36.1	44.8		8.5	9.7	54.8		9.4	18.8	30.6		9.0	54.2	33.5	
9.3	39.9	54.0		9.5	42.4	16.6		9.1	10.7	25.2	A	9.0	26.3	28.5		9.4	50 2.8	3.6	
6.3	42.3	3.1	S	8.5	14 12.1	59.3	A	9.2	14.8	30.7		9.2	28.9	0.6		8.3	11.3	30.8	
9.1	57.9	14.0		9.5	18.7	24.7		9.1	39.3	49.9		9.0	29.7	9.0		9.5	41.9	43.1	
9.5	59 29.4	53.7		9.3	50.0	46.7		9.1	50.1	20.8	A	9.5	39.3	4.3		9.4	51 13.8	28.0	
9.4	37.0	11.1		9.0	50.4	44.0		9.0	28 9.8	34.0	A	8.5	49.8	47.9		9.5	16.0	28.5	
8.8	56.8	13.3		8.5	15 11.8	48.5	B	8.1	12.9	41.2	A	8.9	56.0	46.5		9.0	26.5	25.8	
9.5	0 9.7	22.9		9.5	59.7	20.7		9.2	23.2	29.4		9.5	41 29.2	18.2		9.5	32.0	52.7	
8.3	19.5	54.3	A	9.2	16 39.2	22.3		8.3	26.9	40.5	A	9.5	33.1	30.5		5.5	52.9	3.5	S
8.7	19.9	2.8		9.5	45.0	14.6		9.1	41.5	57.6		8.0	40.9	42.9		8.8	54.1	23.4	
9.3	52.5	48.8	A	9.2	45.2	5.6		9.1	56.0	39.0		9.5	43.0	8.2		9.5	52 40.4	19.3	
9.5	1 19.7	10.6		9.5	55.4	13.9		9.1	29 4.2	35.9	A	9.5	50.4	20.0		9.5	46.6	13.6	
7.8	24.8	32.1	A	9.5	17 12.3	42.6		9.5	30.8	48.0		9.4	58.2	24.3		9.5	48.7	30.3	
9.3	33.6	9.2		9.0	29.6	40.2		9.4	36.4	28.3		9.5	42 4.6	1.4		9.2	53 5.4	5.1	
8.9	52.4	41.9	A	9.4	51.1	54.5		9.4	38.6	29.9		9.4	9.8	21.3		9.5	17.4	23.4	
9.4	2 0.5	55.6		9.4	52.4	33.8		9.2	47.2	30.1	A	9.4	26.5	14.5		9.5	26.3	36.7	
9.3	2.4	18.4	B	7.1	18 5.3	5.9	G	9.2	30 4.2	52.5		9.5	46.1	18.5		9.5	40.6	23.8	
9.4	58.1	55.0		9.4	9.8	46.7		8.1	35.9	21.9	A	9.0	54.0	46.2		8.9	51.8	26.6	
9.5	3 10.8	56.4		9.2	10.5	45.5		8.5	31 24.0	55.0		9.4	54.5	37.2		8.9	54 0.3	55.4	
8.5	56.2	54.4		8.5	22.9	24.4	B	6.3	26.2	11.0	A	9.5	43 0.0	26.6		9.0	11.4	19.5	A
9.4	4 2.5	37.5		9.2	32.1	22.4		9.1	39.9	13.7	A	9.5	11.3	2.8		8.9	33.0	22.8	A
9.5	16.6	40.5		9.4	38.2	0.2		9.1	49.5	30.8		9.5	11.9	33.0		9.4	33.4	12.5	
8.2	28.7	45.2	B	9.5	42.2	29.4		9.5	32 13.1	52.8		8.2	24.8	51.5	F	9.5	33.9	46.0	
9.2	29.7	54.9		9.5	49.1	28.9		9.5	39.0	11.2		9.4	28.1	14.5		9.4	48.9	8.0	
9.4	48.0	35.9	B	9.5	49.2	24.5		9.5	33 6.0	41.0		9.2	34.1	14.5		9.5	51.9	38.2	
9.3	54.2	33.4	B	7.5	19 7.4	45.8	P	9.5	10.8	35.6		9.5	39.9	22.5		9.4	57.8	52.2	
6.2	5 2.5	11.6	G	9.5	38.0	37.8		9.5	34 9.2	31.1		9.4	45.4	22.5		9.4	55 0.0	47.7	
7.9	9.0	42.4	B	9.1	45.1	56.6		9.5	30.3	5.4		9.5	44 6.6	18.7		9.3	8.2	33.0	
9.3	23.6	30.0		7.8	47.7	17.0	L	9.5	34.5	38.2		9.5	28.1	5.4		9.4	8.2	47.5	
9.5	49.0	52.9		8.4	49.6	59.1		9.5	35 8.1	46.7		9.5	30.3	57.4		9.0	9.8	30.7	A
8.3	51.5	21.3	L	8.7	49.9	28.1		9.2	53.3	22.8		9.5	44.4	51.8		9.5	22.7	45.0	
9.2	55.6	3.8	R	8.7	20 12.8	38.1		9.5	36 1.4	57.3		9.4	50.8	9.7		9.5	43.5	41.1	
9.5	6 14.4	45.0		9.4	30.0	49.9		9.5	9.5	58.5		9.4	56.3	37.1		9.4	56 3.1	38.3	
9.5	17.9	30.5		9.4	21 5.3	29.6		9.5	13.7	21.6		9.5	58.7	34.6		9.5	42.4	8.2	
9.5	33.4	46.3		9.5	6.8	33.8		9.5	18.5	34.8		9.4	58.8	57.4		8.3	46.9	20.8	A
9.4	7 1.1	58.5		9.5	8.9	13.2		9.5	19.5	14.0		8.2	45 31.5	41.2	A	9.0	57 19.9	38.0	
9.4	22.6	3.0		9.0	9.7	10.3		9.5	35.0	35.0		8.5	36.4	25.3	A	9.0	26.6	43.0	A

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	19ʰ—20ʰ	+52°			20ʰ	+52°			20ʰ	+52°			20ʰ	+52°			20ʰ—21ʰ	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	57 33.6	13.9	B	9.3	11 10.1	12.2		9.3	23 38.7	39.2		9.3	37 56.0	47.3		9.5	53 51.6	20.1	
8.4	43.1	39.3	A	9.5	30.2	4.4		9.4	50.7	50.8		9.5	38 20.1	35.5		9.5	53.7	51.2	
9.5	44.0	57.8		8.5	33.7	57.4	A	9.4	54.9	15.7		7.9	28.7	6.6	B	9.5	54 16.6	55.6	
9.3	47.0	59.8	B	9.1	42.1	7.0		9.4	57.9	29.0	B	9.4	40.0	34.6		9.4	58.7	42.9	
9.2	53.3	13.9		9.5	46.7	25.4	B	9.5	24 4.3	12.6		9.0	41.3	38.4		8.8	55 2.0	5.4	
8.9	58 22.0	30.2	A	7.3	52.7	3.5	G	9.5	17.0	9.2		9.5	44.7	35.6		8.5	49.1	6.7	
9.5	25.0	20.2	B	9.5	12 3.4	46.4		9.5	32.5	25.2		9.0	39 36.4	45.2		8.9	56 11.5	23.4	
9.5	29.4	40.8		9.0	10.1	51.4	A	9.5	40.1	44.5		8.9	37.9	9.8		9.4	18.6	8.3	
9.2	32.4	53.1		9.3	15.7	59.9		8.3	25 2.8	32.8	A	9.5	40 8.6	29.1		9.3	29.8	32.8	
9.5	40.0	19.8		9.4	26.0	0.1		9.4	9.7	48.9	A	9.2	12.7	21.6		8.8	30.6	38.0	A
8.8	42.7	57.8		9.3	47.8	32.8		7.9	27.6	52.5	A	9.5	38.8	1.6		9.4	57 16.2	49.5	
9.4	59 0.4	57.1		9.4	13 16.3	39.4		8.8	26 10.6	6.2	B	9.3	41 13.7	7.7		9.4	41.7	5.5	
7.5	23.6	9.9	L	9.4	50.4	39.1		9.3	14.2	28.5		9.5	30.9	24.4		9.5	46.7	30.6	
8.8	59.2	20.3		9.5	14 4.6	52.8		9.3	20.3	6.2		9.1	32.5	25.6	B	7.8	55.8	0.3	A
9.1	0 1.5	7.6		9.4	31.9	58.4		8.8	29.5	30.5		9.0	43.8	58.4		8.0	58 1.7	5.7	A
8.2	37.6	48.0	A	9.3	44.8	48.5	B	9.5	58.8	36.9		8.0	47.4	15.1	G	9.5	30.0	42.9	
8.9	58.5	3.2		8.9	15 1.9	13.4		9.4	27 7.0	41.5		8.2	55.1	37.6	A	8.6	31.2	12.7	A
9.0	1 10.7	47.9	A	9.3	17.9	48.6	B	9.3	18.9	46.9		8.5	59.5	46.7	A	9.5	59 4.8	9.7	
9.2	19.9	41.9	B	9.4	19.3	16.1		9.2	25.7	4.0		6.2	42 9.2	28.0	A	5.5	20.7	42.7	A
9.5	33.5	4.9		9.3	16 25.9	39.5		9.4	38.3	43.7	B	7.3	53.7	4.8	A	9.5	33.9	57.1	
9.4	2 0.8	1.7		9.2	32.6	38.7	B	9.2	28 18.5	6.5		9.3	43 3.0	47.5		9.3	34.0	21.0	
8.8	6.5	38.1	A	9.3	44.1	59.5		9.0	31.0	23.9	A	9.5	24.0	37.6		9.0	38.3	10.8	
5.9	24.0	44.5	A	9.4	58.2	38.7	B	9.5	38.1	5.8		9.3	31.7	47.3		9.2	0 0.7	56.6	
9.5	34.3	28.5		9.5	17 18.6	23.3	B	7.4	40.8	31.9	A	9.3	44 42.5	40.0		9.5	21.7	21.7	B
9.1	38.7	8.1		9.5	27.7	17.0		9.4	29 4.7	40.9		9.2	45 1.7	22.8		9.5	23.7	27.0	
9.1	40.8	42.8	A	8.1	34.8	39.1	A	7.5	20.3	18.4	A	9.5	21.6	10.8		9.2	35.4	10.5	
8.8	53.9	36.5	A	9.5	55.7	37.7		9.4	35.2	1.7		9.2	26.7	5.3		9.4	1 6.7	24.6	
9.1	3 4.3	52.9	A	9.4	18 1.2	14.2		7.9	36.7	58.2	A	9.5	28.6	43.1		8.0	9.8	2.4	L
8.8	32.1	27.7	A	9.4	18.0	9.0		7.3	40.1	19.9	A	9.0	43.2	10.8	B	8.8	46.9	33.2	
9.5	56.3	27.9		9.5	21.8	11.5		7.6	53.0	6.0	A	7.8	46.6	2.8	B	9.4	2 40.0	24.3	
9.4	4 4.4	26.5		8.8	24.7	24.4	A	9.3	30 29.5	49.5		9.4	47.4	15.7		9.5	57.2	20.1	
9.0	30.0	56.3	A	9.4	37.7	5.5		9.5	36.4	7.0		9.2	58.0	30.2		9.5	3 38.2	0.5	B
9.5	47.4	25.2		8.6	53.2	56.4	A	9.5	38.9	4.3		9.3	46 1.7	34.9		9.5	45.5	44.1	
8.9	52.2	30.6	A	7.6	56.7	57.4	A	9.5	31 23.7	16.6		9.1	5.7	46.2		7.0	49.0	38.3	A
8.2	54.8	54.8	A	9.0	57.6	52.0		8.8	23.7	50.7	A	9.2	11.2	20.8		9.4	53.1	49.1	
8.1	5 4.9	29.4	A	9.3	57.9	35.1		9.5	31.4	47.8		9.3	11.8	8.6		9.5	57.7	43.4	B
9.4	25.0	22.2	A	9.5	19 46.7	53.8		9.4	54.4	26.7		8.7	25.9	46.0		9.4	4 25.6	2.1	
9.4	29.7	6.7		8.2	51.0	3.9	G	9.3	32 6.8	0.8		9.4	31.4	56.9		9.1	37.4	10.8	
9.5	52.4	23.9		9.4	20 22.9	7.3	B	8.8	11.9	49.1	A	9.5	45.8	16.9		8.6	5 29.3	29.5	A
8.6	55.7	59.8	A	9.5	24.4	34.8		9.2	32.5	49.3	A	9.5	55.0	3.8		5.5	46.9	58.3	A
9.5	6 3.0	12.2		9.5	47.7	23.5		6.5	33 5.8	28.1	A	9.3	47 3.7	23.8		9.5	7 44.6	23.8	
9.5	16.5	47.7		9.5	51.8	32.2		9.5	19.6	32.9		9.5	46.4	31.4		9.5	51.2	16.1	
9.5	39.7	42.8		8.9	56.9	49.2	B	9.5	35.1	29.8		9.2	48 0.3	26.7	B	9.1	56.5	42.1	
8.8	55.4	17.2	A	9.5	21 2.9	50.7		9.5	56.3	55.1		9.0	3.7	6.9		9.5	8 0.8	3.5	
9.2	7 42.0	1.6		8.2	19.6	23.5	B	9.4	34 7.9	4.5		9.4	12.0	49.8		9.2	1.7	37.7	
9.4	50.9	50.8		8.5	33.6	10.2	G	9.5	14.0	57.7		9.2	22.8	1.5		9.0	17.6	7.8	
9.2	56.7	45.6		9.5	34.5	31.9		9.4	15.1	17.4		9.3	49 14.3	36.4		9.5	22.6	38.6	
9.5	8 1.7	21.9		9.5	37.7	7.0		9.3	44.7	28.9	A	9.4	23.6	14.7		9.0	29.1	53.0	
9.3	13.4	53.1		9.3	41.9	33.2	B	9.5	51.7	2.8		9.5	29.4	10.4		8.9	33.3	5.0	
9.2	17.5	36.6		9.4	46.2	4.1		9.5	35 5.2	56.9		9.4	33.2	56.1		8.6	45.0	4.1	L
9.3	42.9	44.4		7.9	49.5	39.3	L	9.2	33.5	57.9		8.9	42.4	54.6		9.5	9 13.8	46.1	
9.5	47.3	58.0		9.3	54.1	0.2		9.4	37.6	37.4	B	9.5	57.2	8.1		7.1	23.9	6.[illegible]	
9.5	47.4	49.6		8.6	22 1.2	14.3	A	9.0	45.6	50.5	A	9.5	50 59.0	52.2		9.2	56.6	28	
9.5	54.0	51.2		9.5	4.0	14.1		9.4	36 35.7	2.1		9.3	51 45.2	39.2	B	9.5	10 1.8	[illegible]	
9.5	9 34.0	58.5		9.3	6.2	2.6	A	9.0	37.7	35.6		9.5	52 3.3	42.0		9.1	53.5		
8.4	39.7	23.3		9.5	12.0	11.3	B	9.5	59.8	30.6		8.9	13.7	16.0	B	9.4	58.0		
6.5	48.6	40.7	A	8.0	44.2	19.1	A	9.5	37 8.8	4.2		9.4	19.5	19.5		9.1	11 3.[illegible]		
9.5	10 35.2	0.8		9.5	53.4	47.5		9.0	42.7	46.0		9.5	33.1	11.8		9.5	1[illegible]		
9.4	44.9	38.6		8.5	23 16.8	32.8	A	9.1	48.0	54.9	B	9.4	45.6	38.3		9.5	1[illegible]		
9.5	48.3	35.3		9.5	17.2	2.8		9.3	51.9	54.9	B	9.5	53 23.2	3.8		9.5	3[illegible]		

2901—2960				2961—3020				3021—3080				3081—3140				3141—3200			
	21ᵘ	+52°			21ᵘ	+52°			21ᵘ	+52°			21ᵘ—22ᵘ	+52°			22ᵘ	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	11 54.1	42.6	A	9.5	26 44.6	7.3		9.5	38 33.1	4.2		8.8	55 59.3	21.9		9.1	7 12.2	59.2	B
8.2	12 9.9	34.0	A	8.5	59.9	45.6		9.2	47.0	55.3		9.0	56 28.0	14.7		9.5	30.6	49.9	
9.5	32.2	4.1		8.3	27 23.5	6.9	A	9.5	39 13.7	2.0		5.3	32.5	11.0	G	8.2	34.5	12.5	
9.5	13 28.2	59.9		8.4	26.4	11.9	A	9.5	14.0	40.0		9.5	57 10.0	16.2		8.5	43.4	54.5	B
9.5	42.0	12.6		9.5	31.5	36.5		9.5	54.2	52.6		9.4	28.5	20.6	B	9.5	47.8	29.1	
9.5	14 8.5	48.5		9.1	43.8	26.6	B	8.8	40 7.3	13.6		9.1	58 14.6	22.6	A	7.1	55.5	26.2	B
8.8	38.6	58.5		7.6	28 25.2	56.9	A	8.6	13.9	49.3	A	8.0	18.4	1.0	A	9.4	8 9.5	54.4	
9.0	46.4	42.5		9.3	40.7	16.0		9.4	21.9	33.8	B	8.3	22.2	30.5	A	9.4	9.6	47.0	
8.0	49.3	52.4	A	8.8	54.5	2.8	A	9.5	50.1	36.8		9.4	49.4	4.6		7.6	25.1	33.1	B
8.2	50.5	18.8	B	9.5	29 0.7	5.2	B	8.8	50.1	14.5		9.2	57.7	44.5		8.2	27.9	3.2	
8.7	54.6	27.1		9.4	24.6	50.4		8.4	41 1.0	12.5		9.1	59 10.4	30.4	B	9.2	39.5	57.8	
9.3	15 0.5	58.3		9.5	27.9	17.1		9.0	25.5	55.3	A	9.5	16.1	52.8		7.9	48.9	13.1	L
6.5	1.5	26.8	S	9.4	37.0	31.8		9.2	34.2	19.1		9.4	20.1	31.5		8.6	55.7	58.5	A
8.4	2.1	42.5	A	9.0	30 2.2	58.1		9.2	34.5	6.7		9.3	39.0	27.1		9.5	9 5.9	3.1	
7.7	15.4	42.6	A	9.5	6.5	0.3		8.5	42 3.1	38.0		8.8	54.4	48.2	A	8.5	10.2	30.7	
6.9	18.9	22.1	S	9.4	10.0	6.2		9.3	6.3	0.9		9.3	59.1	39.9		9.5	22.3	38.1	
9.3	27.3	40.9		9.4	11.4	43.4		9.1	45.0	8.7		9.5	0 7.5	42.1		9.5	48.2	2.1	
9.5	29.6	58.2		9.0	12.0	50.9		8.6	59.0	48.9	A	9.1	7.5	57.6		9.5	10 0.6	27.9	
9.2	51.5	3.7		8.0	45.1	11.2	L	9.2	43 7.0	31.0		9.0	8.8	8.0		9.5	2.4	57.7	
8.5	16 7.1	46.0	A	8.5	45.1	30.0		7.8	7.3	24.6	L	9.3	10.5	30.1	B	9.4	9.0	51.6	
9.3	29.6	45.5		9.5	57.5	29.7		8.5	44 0.9	44.1	A	9.0	10.8	5.5		8.8	18.3	16.7	
8.2	38.0	40.0	A	9.5	57.7	51.5		8.5	3.8	47.7	A	8.9	11.6	40.0		9.1	45.0	52.7	
9.5	52.5	7.5		8.0	31 10.7	10.2	L	6.7	55.3	1.2	G	8.9	28.4	20.0	A	9.2	54.1	13.5	
9.5	17 44.8	50.0		9.4	16.2	0.8		9.4	59.1	59.8	B	9.4	37.6	20.3		9.1	11 18.9	53.1	
9.5	46.6	45.5		9.5	27.6	22.9		9.0	59.6	4.6		7.2	38.9	55.0	A	9.5	24.4	31.0	
9.5	52.0	9.3		9.5	36.0	26.5		9.4	45 2.1	59.8		9.5	41.3	25.5		9.5	28.0	25.1	
9.5	58.1	38.8		9.5	37.5	42.3	B	9.5	46 31.7	57.6		9.4	1 5.8	47.0		8.7	30.1	55.5	A
9.5	18 54.0	10.2		9.5	38.5	43.7		9.3	46.9	57.9		9.4	8.6	31.2		8.1	33.6	16.8	A
9.5	55.6	11.7		9.2	32 8.9	17.8		8.8	51.5	1.7		9.2	13.4	58.9	A	9.5	52.7	28.8	
9.3	19 20.4	30.4		7.3	13.8	43.6	A	9.5	47 2.0	13.5		9.3	16.7	19.7		9.5	54.2	40.2	
8.0	55.1	44.9	A	9.0	19.6	5.3		9.5	15.9	57.9		8.4	16.9	5.0	A	9.4	55.3	33.7	
9.5	20 15.6	15.9		8.3	21.5	45.3	A	9.5	41.0	17.6		7.9	28.0	26.2	B	9.5	12 28.0	25.3	
9.5	19.5	8.3		8.5	29.0	11.7	L	9.5	48 5.3	45.5		9.4	37.0	59.7		9.4	35.4	33.3	
9.5	50.6	52.0		9.2	51.3	34.5	A	9.2	16.5	8.1		6.2	2 4.1	35.5	A	9.5	53.2	57.7	
7.5	21 0.9	14.2	A	9.5	51.3	23.3		9.2	51.3	43.5		9.5	6.5	43.0		9.5	13 14.1	36.8	
9.5	33.5	50.2		9.5	51.3	25.8		8.5	49 2.0	17.0		9.0	26.2	9.5		9.3	14.3	47.2	
9.3	38.6	57.3		9.5	55.0	54.3		8.3	15.2	40.5		9.3	28.3	50.5	B	9.4	31.8	8.6	
7.7	42.8	7.1	A	8.8	57.7	22.5	B	8.3	27.6	49.6	A	9.3	38.9	1.0		9.5	35.2	59.2	
5.8	58.6	16.1	A	9.5	33 9.4	28.5		9.4	46.9	26.6	B	9.5	44.7	46.9		8.9	40.0	52.7	A
9.2	22 8.1	49.8		9.5	24.8	41.8		9.0	50 0.1	59.0	A	9.5	3 8.0	51.2		9.2	52.5	25.8	
9.0	25.7	28.8		9.5	28.0	0.8		9.5	7.6	6.1		9.5	21.1	5.2		7.5	14 9.1	9.0	A
9.5	41.9	38.8		9.2	31.8	58.4		9.4	11.2	52.7		9.2	23.0	15.5		8.0	23.0	8.6	A
9.5	23 7.0	26.7		6.5	42.8	55.7	G	6.5	25.0	33.9	A	9.5	26.2	42.5		9.2	39.6	27.9	
9.5	10.7	41.4		9.5	34 27.0	15.9		9.4	25.8	47.7	B	9.4	50.4	0.5		9.4	15 13.4	1.8	
6.7	14.5	39.8	L	8.1	54.1	44.9	G	8.3	42.5	13.1		9.5	4 46.5	50.3		8.7	13.9	3.0	A
9.5	39.2	54.0		9.0	59.2	40.0		9.5	56.2	0.8		9.0	5 0.3	40.4		9.5	18.5	42.3	
9.5	52.1	42.6		9.5	35 42.1	15.8		9.5	51 0.5	8.6		9.4	1.1	5.6		9.4	20.1	49.9	
9.0	59.6	9.7	A	9.5	47.2	5.7		8.3	16.5	44.9	A	9.3	19.5	4.9		9.3	29.9	2.4	
8.4	24 5.5	26.7	A	9.3	50.4	41.2		9.5	29.5	31.5		9.4	23.4	33.2		9.0	48.2	40.3	
9.4	58.6	55.1		9.3	53.0	27.2		8.7	37.8	46.4	A	9.3	52.2	30.5		9.4	16 10.4	2.0	
9.5	25 1.4	18.0	A	9.5	36 20.1	37.7		8.8	52 24.0	7.0	A	9.4	54.0	26.1		9.5	35.0	45.6	
9.5	3.6	19.4	A	9.5	48.6	25.4		9.5	53 9.7	2.7		8.5	58.3	16.2		9.4	53.9	49.9	
7.2	4.6	17.9		9.5	48.8	40.1		9.0	26.2	9.6	A	9.4	59.7	55.0		9.5	57.5	59.2	
9.5	12.1	38.6	B	9.5	54.9	40.1		9.5	54 13.6	6.7		9.5	6 10.0	7.2		9.4	17 10.3	7.8	
8.8	13.4	11.8	A	8.7	37 8.5	42.4	A	9.5	38.2	27.1		9.1	45.2	59.0		9.4	12.2	51.2	B
9.2	30.6	31.1		9.0	11.8	38.1	A	9.5	44.0	0.7		9.5	52.6	7.5		9.2	12.6	14.5	
6.3	31.5	19.2	A	7.9	28.7	20.7	A	9.4	55 8.9	39.8		9.4	55.5	18.3		9.4	45.8	49.1	
8.9	26 1.9	12.6	A	9.5	34.5	29.5		9.5	32.2	0.6		9.5	7 7.4	30.8		9.4	51.9	3.8	
9.4	14.8	34.7		7.5	41.6	35.3	A	9.5	37.1	24.0		9.5	9.0	8.0		8.5	18 16.1	31.9	
9.5	39.5	6.8		9.4	38 4.1	35.4		9.4	44.5	18.6		9.5	10.2	10.0		9.5	16.6	20.6	

3201—3260				3261—3320				3321—3380				3381—3440				3441—3500			
	22ᵐ	+52°			22ᵐ	+52°			22ᵐ—23ᵐ	+52°			23ᵐ	+52°			23ᵐ	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	18 25.9	59.7		9.1	33 53.5	56.9		9.0	47 35.9	33.9		8.8	4 31.3	41.6		8.9	19 2.1	48.0	
9.5	58.5	52.8		9.2	34 12.8	47.9		9.5	54.7	2.1		9.2	37.0	10.9	B	7.9	3.2	34.6	A
8.2	19 0.2	0.4	A	9.3	38.9	18.3	B	9.5	48 52.0	7.9		7.2	41.2	16.5	G	9.4	12.4	3.7	
8.9	0.2	1.7	A	9.4	40.5	17.5		9.5	58.9	54.8		9.3	49.0	13.1		8.3	16.1	23.0	A
9.1	14.1	31.8	R	9.4	49.0	43.2		9.4	49 9.5	56.5		9.3	53.7	10.7	B	9.5	30.6	59.3	
8.4	24.0	59.3		9.5	35 3.1	35.0		9.5	44.3	8.7		9.1	5 0.5	6.4		7.8	37.0	22.1	A
9.1	28.0	23.8		9.5	32.4	39.5		9.2	50 21.6	3.2		9.5	25.9	46.0		9.3	44.3	4.6	B
9.2	45.1	5.0	A	9.5	36 2.2	46.6		9.5	32.5	59.8		8.5	32.9	33.9	L	9.0	50.8	38.6	A
9.5	45.7	46.0		8.9	5.1	5.0	A	9.2	36.7	1.3		8.6	36.2	24.0	L	9.5	20 22.9	15.2	
9.4	21 15.6	54.7		9.4	8.8	48.4	B	9.5	44.6	16.7		8.2	43.8	2.0	A	9.5	42.6	16.0	B
9.5	24.2	45.0		8.0	19.9	2.7	A	8.9	50.0	10.8		8.3	6 44.2	19.9	B	9.2	21 17.7	2.5	
8.8	32.4	21.9	L	9.4	40.0	23.9	B	9.2	52.8	57.2		9.4	59.2	55.3		9.2	22.3	6.1	
8.2	22 6.2	13.6	A	9.5	37 23.0	41.3		9.1	56.6	37.1	B	9.5	7 2.0	47.0		8.5	22 2.1	17.5	L
9.1	12.2	4.7		9.2	36.8	53.1	A	9.5	51 50.1	56.0		9.5	12.5	30.5		6.8	5.3	52.0	G
9.3	28.2	31.7	R	9.5	50.9	41.6		9.5	50.2	6.2		9.5	16.7	59.2		8.4	21.6	36.4	A
9.4	41.8	51.0		9.5	38 6.2	28.3		8.8	52 29.1	50.2		9.4	18.8	0.0		8.7	37.9	21.0	L
7.7	46.1	7.5	A	9.5	27.0	46.3		9.5	41.5	58.3		9.0	42.8	38.6		8.6	39.7	2.3	A
9.3	48.0	53.8	B	9.5	28.1	42.4		9.4	53 4.1	24.2		9.5	55.2	3.8		9.5	23 25.4	8.7	B
9.5	23 4.9	1.2		9.3	30.9	36.7		8.6	4.6	56.0		9.3	57.9	0.1		9.5	26.5	58.0	
9.4	14.6	40.0		7.5	32.3	59.9	A	9.2	7.2	15.6	B	8.9	8 0.5	32.0		9.3	24 24.9	20.0	
8.5	22.9	1.5	A	7.5	48.5	32.5	A	9.5	8.1	16.9		9.4	10.1	3.6		9.0	28.7	5.1	A
8.2	34.2	16.8	A	9.4	50.5	40.4		9.0	23.5	55.3		9.5	23.5	50.7		9.4	29.3	9.6	
9.5	41.5	21.7		9.4	39 13.2	26.9		9.4	26.0	16.7		9.2	31.5	33.5		9.1	41.1	38.0	
9.5	51.6	45.0		9.5	25.0	18.5		9.5	35.7	28.3		9.4	38.3	53.4	B	9.0	47.7	21.6	A
9.3	53.7	17.9	A	9.5	30.0	26.9		9.3	37.6	57.5		9.2	9 19.9	10.2	R	9.3	25 1.9	47.3	B
9.2	24 20.6	44.9		7.8	32.4	36.6	A	8.9	54 13.6	6.0		9.5	28.5	17.5		9.0	3.2	18.6	A
9.5	38.7	55.4		9.3	34.3	28.2		9.3	33.4	46.8		9.0	29.9	11.9	R	7.9	34.1	30.4	L
9.5	41.7	24.7		7.5	34.9	7.0	A	9.4	39.3	44.9		9.0	43.4	47.5	A	9.2	36.6	22.5	
7.8	51.4	47.1	A	9.5	51.1	1.1		8.8	52.9	44.1	B	8.9	56.9	41.9	A	7.0	45.5	53.2	G
9.4	25 9.9	4.4		9.1	40 30.3	28.5	A	9.5	53.0	47.8		5.4	10 7.6	26.3	G	9.3	50.2	32.0	
9.5	12.6	35.1		8.0	42.1	52.5	L	9.5	55 9.7	29.5		9.3	26.9	21.3	B	8.5	26 0.3	59.7	
8.4	44.5	7.2	A	8.7	51.6	19.8		9.4	19.2	4.8		9.4	30.8	54.8		9.2	2.1	18.0	A
9.3	45.7	41.1		8.2	58.5	59.3	L	9.5	23.8	39.4	B	9.5	39.5	2.0	B	9.3	6.8	15.6	A
9.5	53.9	1.5		9.5	41 13.4	56.4		8.1	28.4	3.8	A	9.0	11 21.6	25.0		9.0	14.4	16.5	A
8.8	26 15.6	17.1	R	7.0	17.3	37.3	A	9.4	28.9	31.6		9.5	57.0	3.5		9.2	21.7	4.3	
8.7	28.4	55.5		9.0	35.0	53.3		9.5	48.0	48.3		9.4	12 18.6	33.0		9.4	24.9	8.3	
8.7	35.2	28.7	A	9.0	35.9	3.1	A	8.0	56 27.4	27.8	A	8.3	24.1	28.0	A	9.3	37.6	17.5	
9.4	56.1	6.1		9.5	47.0	18.0		9.5	32.3	34.2		9.5	27.0	2.8		9.5	37.8	14.2	
9.5	27 11.0	50.3		9.5	42 0.2	55.4		9.3	52.4	42.1		9.3	13 5.2	52.7		9.5	46.5	44.5	
9.5	15.2	58.3		9.4	23.6	48.6		7.5	57 8.5	31.3	A	9.5	5.4	47.0		9.0	27 23.0	6.5	
9.3	34.1	30.7	R	9.4	43 28.9	5.1		9.4	15.7	44.4		9.3	5.6	16.6		9.5	36.6	45.5	
9.5	28 4.9	19.6		9.1	41.4	8.2		8.8	27.2	47.6	A	8.8	45.6	29.0	A	8.8	49.7	4.2	
9.0	32.9	2.4		9.3	44 15.5	3.3		9.3	45.6	9.6		9.5	14 43.5	52.8		9.1	28 39.6	0.0	
9.5	29 1.4	18.8		9.4	17.0	7.5		9.5	58 10.0	43.1		9.2	54.7	43.7		8.9	47.9	55.3	A
8.7	8.0	14.1	R	9.5	28.1	20.5		8.5	13.4	10.3		9.2	58.7	28.2		9.2	29 25.2	13.1	
9.0	27.4	55.3		9.4	29.9	20.7		8.4	18.2	15.4		9.0	15 51.3	36.0		7.5	30 10.4	39.1	B
8.3	51.3	27.2	G	9.5	41.5	5.9		9.5	57.3	28.3		8.8	16 18.7	0.0		7.9	31 2.7	1.2	L
9.4	30 0.1	5.8		8.6	48.7	16.6		8.8	59 11.2	27.3		9.5	19.6	3.0		9.4	45.7	55.0	
9.2	45.9	54.4		9.3	53.8	59.8		9.4	34.4	34.6		8.1	44.8	5.1	A	9.1	32 44.1	50.9	
9.5	55.7	40.1		9.5	45 20.5	6.9		9.1	0 37.5	28.5		9.0	48.3	10.6		9.5	33 6.2	56.2	
9.5	31 25.8	9.6	B	7.0	37.3	15.6	B	5.5	45.5	2.0	A	9.5	50.1	55.8		8.5	47.4	7.5	
8.9	32 8.6	3.2		7.9	39.7	25.3	B	9.2	52.5	9.1		9.5	17 6.3	8.8		9.5	34 6.2	7.0	
9.4	14.1	52.8		9.4	44.8	30.5		9.5	2 4.8	46.8		9.2	48.1	36.3	B	8.6	20.0	56.6	
9.3	23.5	40.6	B	9.2	48.5	18.1	S	9.5	35.4	45.4		9.5	56.5	13.2		9.0	36.0	4.5	
8.9	38.7	52.9	A	8.3	52.4	57.0	A	9.4	3 3.8	16.2		7.8	58.0	37.0	B	9.0	52.1	22.5	
9.1	40.3	29.8	A	9.5	46 12.1	14.0		9.4	12.1	4.7		9.4	18 0.2	51.3		9.5	56.9	2.5	
8.1	45.0	6.7	B	9.3	22.5	23.0		9.1	50.4	12.9		9.3	0.6	36.5		9.1	35 19.6	49.8	
9.5	33 8.2	37.0		9.5	40.2	39.0		9.5	53.0	33.4		9.3	36.7	34.0		9.3	43.9	57.2	B
9.4	17.7	0.6		9.3	54.3	2.0	B	8.8	4 1.2	52.3		9.4	53.1	18.6		9.5	46.6	56.9	
9.5	24.4	43.3		9.5	55.1	32.5		9.2	29.5	4.0		7.0	54.0	12.2	A	9.5	46.7	28.3	

3501—3521				3522—3541				3542—3561				3562—3581				3582—3601			
	23u	+52°			23u	+52°			23u	+52°			23u	+52°			23u	+52°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	35 53.9	18.7	B	9.1	40 4.4	28.7	R	9.4	42 59.5	22.1		9.5	49 5.1	18.1		9.0	53 52.0	24.2	L
9.0	36 1.2	32.0		9.5	19.0	10.2		8.6	43 3.4	5.8	A	7.5	13.1	54.5	A	9.4	54 20.0	54.2	
6.5	4.0	20.8	J	9.5	20.1	19.0		9.5	43.7	55.3		8.8	49.0	56.9	A	9.2	23.2	3.2	
9.0	35.8	10.7		9.1	23.0	25.5	R	8.4	44 31.6	17.2		9.5	50 8.6	54.5		9.4	45.7	5.0	
9.5	51.3	13.5		8.8	47.6	29.8	R	9.0	44.5	24.5		9.5	23.5	57.4		9.5	57.5	30.7	
9.1	37 4.6	54.1		9.5	41 2.2	8.7		8.8	50.2	22.1	R	9.0	30.2	46.5	A	9.3	55 17.8	14.4	
9.3	10.4	45.9		9.1	12.4	8.4	R	9.2	45 16.3	57.5		9.2	36.2	31.4		9.0	54.2	44.3	
9.5	11.4	42.8		8.6	14.3	28.3	A	9.1	30.4	40.1		8.7	43.2	22.2		9.5	56 1.0	59.6	
9.5	15.5	28.5		9.2	15.0	43.4	B	9.5	34.8	11.3		7.5	51 22.0	35.0	A	8.0	3.3	30.5	G
9.5	23.0	49.3		8.9	19.4	33.1		9.4	36.5	2.3	R	8.2	29.4	51.9	A	9.1	17.4	40.6	
9.4	36.4	26.8		9.3	28.4	27.9		8.8	59.7	17.0	A	9.1	30.0	32.6		9.0	24.8	23.5	
9.5	38 0.2	42.4		9.5	29.2	32.2		9.5	46 9.5	57.5		8.2	41.3	26.6	A	9.3	44.8	13.9	
9.5	2.0	7.2		9.0	38.0	18.8		8.3	11.1	19.2	A	9.0	51.8	40.8	A	9.4	57 15.7	48.1	
9.4	6.5	57.8		9.4	38.0	8.1		9.3	20.6	56.0		7.3	52.3	45.8	A	9.4	40.3	50.2	
9.5	12.5	56.5		9.4	43.3	48.4		9.5	24.5	43.7		9.5	52 23.8	55.9		9.4	52.7	2.4	B
9.5	24.1	54.9		8.7	49.9	23.9	A	9.5	24.7	46.2		9.5	50.3	38.4		9.5	58 2.9	2.4	B
9.4	45.0	11.2		9.2	42 12.0	21.9		9.1	47 20.5	54.5		9.5	53 12.1	55.0		7.0	8.1	21.6	A
8.9	54.5	18.0		8.8	29.0	30.4	A	7.5	32.4	41.3	G	9.3	28.1	47.9	A	8.5	35.9	28.6	G
9.4	58.6	52.9		9.4	35.1	38.7		9.5	48 32.8	13.6		9.0	32.0	28.1		9.0	59 32.0	21.4	
8.7	39 16.2	49.0		9.3	59.4	4.7	A	8.9	58.0	23.1	A	8.2	44.3	21.3	L	9.4	48.6	21.2	
9.5	46.5	21.4																	

Zone +53°

1—20				21—40				41—60				61—80				81—100			
	0u	+53°			0u	+53°			0u	+53°			0u	+53°			0u	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	0 24.6	57.9		9.5	5 14.5	4.5		9.4	12 17.3	25.6		8.8	15 53.1	37.8	B	8.1	23 47.5	9.7	G
9.5	49.9	9.5		9.0	27.8	39.6		8.6	29.9	24.0		9.0	16 2.5	21.5		5.2	48.8	43.3	G
9.0	52.3	53.7	A	9.4	53.7	14.2		9.2	45.8	27.5		8.5	3.4	52.8		8.2	52.4	30.0	
9.2	53.8	14.8		8.2	6 8.1	39.4		9.1	13 6.0	11.6		7.3	25.6	1.0	A	9.5	24 0.2	36.5	
9.3	1 10.9	20.3		8.2	57.5	1.3		9.5	7.4	25.0		9.0	33.3	34.2	B	7.4	13.3	1.0	G
8.3	11.9	0.3	A	9.5	7 18.4	27.8		9.5	11.4	53.5		9.3	44.7	29.2		8.5	25.4	8.8	
9.5	17.3	51.5		7.1	23.5	16.4	B	9.5	24.5	7.2		8.4	17 8.1	4.2	A	9.5	39.1	12.9	
9.3	24.1	39.6		9.5	25.9	25.2		9.5	40.5	32.1		9.5	18 10.0	31.1		9.5	44.2	50.6	
8.7	2 1.4	32.7		9.4	39.5	8.4		9.4	14 33.2	31.9		9.0	38.5	42.4	A	9.5	44.9	29.3	
9.4	12.8	54.6		7.0	8 45.8	8.3	L	9.2	34.3	10.5		9.3	48.4	26.2		7.3	47.8	19.2	G
9.5	20.9	20.9		6.8	9 0.9	51.3	S	9.1	37.1	19.3		9.5	58.1	47.2		9.5	57.0	26.1	
9.5	40.0	14.2		9.2	20.3	19.5		8.5	46.8	28.7		9.5	19 17.0	9.3		9.5	58.2	58.2	
9.5	48.4	44.7		9.5	37.8	48.4		7.1	15 0.0	50.2	G	9.0	35.3	15.9		9.5	58.5	29.1	
9.5	3 46.7	52.6		9.0	10 21.1	1.4		8.3	4.2	31.7		9.5	42.2	54.1		9.0	25 15.8	9.9	
9.4	4 5.5	59.5		9.1	39.0	21.4		9.5	9.9	25.2		9.2	20 9.4	55.8		9.2	17.5	21.2	
8.0	6.9	31.7	B	9.5	53.0	44.8		8.1	10.7	28.8	L	9.5	27.1	18.8		9.4	31.0	50.4	
9.5	12.2	59.3		9.4	11 26.1	5.3		9.4	21.5	10.9		9.5	21 34.8	4.3		9.2	45.5	59.7	
9.0	14.9	7.6		9.4	29.9	42.0		9.5	23.6	59.8		9.5	43.9	7.7		7.3	26 13.0	15.9	G
9.5	29.9	14.1		9.5	59.1	37.6		9.0	27.2	44.8		9.5	22 12.5	39.2		9.3	40.1	2.6	
9.2	51.9	14.5		9.3	12 4.5	18.8		8.5	30.0	31.1	L	9.4	48.2	36.2		7.1	27 27.2	24.4	G

101—160				161—220				221—280				281—340				341—400			
	0u	+53°			0u	+53°			0u—1u	+53°			1u	+53°			1u	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	27 54.2	50.3		9.5	44 19.8	45.9		9.0	57 33.0	59.7		7.3	12 10.5	52.3	A	9.5	27 33.0	11.6	
5.8	28 6.0	22.2	G	9.1	26.9	6.7		9.1	33.8	22.1		9.5	28.2	55.6		9.4	46.1	25.4	
9.4	40.5	52.4	B	9.4	31.0	58.9		9.4	54.5	38.6		8.8	13 2.6	53.7	A	9.5	52.5	1.7	
9.5	40.8	50.2		9.5	34.1	56.9		8.8	55.7	49.9		9.5	13.5	2.0		8.8	28 10.9	59.8	A
4.1	56.0	5.9	S	9.5	34.8	43.2		9.5	58 0.0	59.6		9.5	25.1	6.8		8.1	26.3	22.3	B
9.5	29 12.9	22.3		8.9	45 4.9	40.8	B	8.8	2.8	35.3		9.3	39.0	18.6		9.5	27.5	50.3	
9.5	52.8	25.7		9.2	7.5	29.1		9.5	48.1	1.7		9.5	44.6	35.9		9.5	36.5	51.8	
9.2	58.1	51.6		8.9	11.9	49.8		9.5	59 4.2	56.6		9.5	14 7.5	49.8		9.5	58.8	45.4	
9.0	30 39.1	45.2		8.7	16.2	17.5		6.8	43.7	27.3	L	9.0	15.4	48.3	A	8.2	29 1.4	50.9	B
8.3	52.0	54.7	A	9.5	20.6	33.5		9.5	0 13.3	0.8		9.5	29.5	48.1		9.3	16.4	26.8	
9.5	31 43.0	12.4		9.4	27.9	47.1		8.8	27.2	22.3		8.9	52.5	29.0	A	9.0	17.6	18.5	
9.5	55.1	56.2		9.5	38.0	43.5		9.5	31.9	50.8		9.5	58.3	59.8		9.3	52.5	7.3	
9.5	32 23.4	16.9		8.9	59.4	44.1		9.4	56.1	42.4		8.0	15 8.5	36.0	A	9.5	58.5	1.5	
9.3	29.5	19.9		9.4	46 54.1	12.3		8.6	1 2.5	51.3		9.5	10.2	57.3		7.5	30 4.6	51.8	L
9.4	31.8	23.9		9.3	58.6	47.1		9.2	3.5	34.8		9.5	15.3	3.7		8.0	15.2	23.9	B
9.5	44.7	37.9		8.0	47 10.2	35.3	R	7.0	9.8	58.2	A	9.1	26.6	34.4	A	9.5	38.5	43.7	
9.1	33 17.8	7.9		9.3	17.5	14.9		9.5	10.7	43.3		8.7	16 7.5	38.2	A	9.4	40.5	30.9	
9.4	30.0	58.9		9.0	28.9	53.0		9.5	27.5	52.8		8.7	12.5	11.4		9.5	44.5	31.4	
9.0	43.8	15.0	B	8.5	42.7	19.4		9.5	29.2	57.5		9.5	17 27.8	41.9		9.4	51.8	50.2	
8.5	46.7	58.8		9.0	45.0	14.4		8.7	56.5	42.9	A	9.5	31.3	43.3		9.3	52.5	49.2	B
8.9	52.4	9.7	A	9.5	48 29.4	36.9		8.8	59.0	32.3		9.5	44.1	41.0		9.4	53.0	27.2	
9.3	55.2	30.4	B	9.5	50.0	30.2		9.2	2 16.2	37.9		9.3	48.2	34.3		7.8	58.6	42.9	L
9.2	58.8	18.9		9.4	55.9	35.2		9.2	19.3	15.8		9.4	18 7.9	6.8		7.0	31 1.7	8.0	G
9.5	34 9.7	14.7		8.4	49 7.9	36.7	B	9.4	23.6	16.3		9.5	37.8	36.9		9.4	13.0	21.8	B
9.5	51.1	18.4		9.1	52.6	38.5	B	9.5	33.4	22.0		9.5	42.3	33.0		9.5	54.4	12.5	
9.5	59.0	2.4		9.3	50 0.1	52.5		9.4	35.8	22.6	B	9.5	58.5	53.3		9.4	32 39.5	4.4	
9.5	35 2.8	12.2		9.5	19.6	4.6		9.5	40.1	35.1		9.5	19 5.5	18.7		9.4	54.7	45.5	
9.5	45.2	56.1		9.5	23.2	28.7		9.5	56.0	39.3		9.4	27.2	24.1	B	9.2	56.1	22.7	B
8.5	47.1	48.0		9.3	25.0	1.4		9.5	3 6.3	2.8		8.5	36.5	15.2		9.3	33 0.2	23.5	
9.0	36 10.8	35.3	A	9.3	26.1	7.3		9.5	16.7	54.0		8.1	20 16.9	36.8	A	9.5	9.2	57.6	B
7.5	12.0	21.0	A	9.3	33.6	4.2		9.5	24.2	44.2		8.5	22.3	28.3	A	9.5	46.9	5.7	
9.5	39.0	55.9		8.9	33.7	48.2		9.2	32.5	52.7		8.7	23.1	33.8	A	9.5	50.5	43.3	
9.5	59.7	51.8		8.9	33.8	51.4		9.3	4 5.9	44.4		8.5	47.0	51.7		9.2	51.0	50.6	
9.5	37 12.6	16.3		9.3	51 4.1	14.6		8.2	20.8	37.9	A	8.7	53.3	2.2		9.4	34 11.6	50.8	
9.5	13.0	51.9		9.3	10.9	16.7		9.3	5 37.1	48.9		9.2	21 1.6	57.1		8.6	34.7	13.2	
9.5	31.6	21.5		8.8	12.5	59.5		9.4	48.5	14.5	B	8.6	8.4	30.9	B	9.3	35 10.7	39.3	
8.5	38.8	41.8	A	8.8	18.3	57.0		9.2	51.5	53.3		8.1	19.5	23.7	A	9.4	24.4	19.5	
8.0	39.2	51.5	A	8.8	41.4	23.7		9.5	6 33.8	55.7		9.3	54.1	41.2		9.4	50.9	50.5	
9.3	41.7	26.6		9.4	52 2.5	13.8		9.3	50.9	6.8		8.8	22 8.7	23.6	A	9.4	53.1	13.5	
9.2	55.0	50.8		9.5	7.0	41.0		9.3	7 5.5	9.1		9.0	26.8	29.5	A	9.5	36 25.0	27.7	
9.1	58.6	29.4	B	9.5	12.5	34.8		9.0	19.4	39.8		9.5	45.2	34.3		9.5	27.4	38.0	
9.5	38 23.1	35.1		8.0	37.7	48.1	A	9.5	46.8	38.5		8.9	48.5	14.5	A	9.0	44.9	43.2	
8.1	36.0	49.2	A	8.9	53 2.0	2.4		8.9	48.8	58.8		7.4	23 1.1	16.4	A	9.2	37 2.8	17.5	
9.5	39 19.2	15.0		9.5	30.0	50.8		9.4	54.5	18.1		9.5	6.9	3.7		9.2	58.7	35.5	
9.2	58.3	17.0		9.5	33.9	49.6		9.5	8 5.9	50.7		8.4	20.6	43.9		9.5	38 12.5	29.2	
8.6	40 20.7	22.0	A	9.2	48.7	44.9	B	8.3	11.5	0.1	B	8.6	31.2	59.4		7.2	22.7	16.7	A
9.2	33.0	31.3		8.5	57.4	28.5		9.5	21.6	35.7		8.9	24 1.3	31.2		9.4	29.0	48.1	
9.3	38.5	36.3		8.5	54 41.9	7.9		9.5	35.5	31.3		9.1	26.3	6.8	A	8.0	43.6	9.9	A
9.3	57.4	13.6	A	9.4	55 27.1	2.4		9.5	54.0	14.0		9.5	25 14.3	10.0		9.5	39 13.8	41.2	
9.3	41 6.4	13.4	A	8.5	42.0	40.4		9.5	9 9.8	55.6		9.5	28.2	32.7		9.5	19.9	17.4	
9.4	9.2	52.1		7.0	45.9	25.3	L	8.0	12.6	9.1	B	9.5	43.0	29.2		9.0	29.8	3.5	A
9.5	45.7	46.4		9.2	56 5.0	26.6		9.5	26.6	57.1		9.5	50.0	7.4		9.5	46.8	26.6	B
9.5	42 22.9	56.4		9.0	12.0	54.5		9.4	10 4.1	9.0		9.5	26 0.3	45.8		9.5	59.7	3.9	
9.5	42.5	29.5		8.9	16.1	49.2		9.0	6.4	0.5		9.5	21.7	32.7		8.9	40 0.0	9.1	A
9.5	43.1	37.3		9.5	53.4	9.2		8.7	9.5	43.1		8.7	25.0	58.9	A	8.8	17.5	11.3	A
9.1	43 14.1	26.0		8.9	57 0.0	20.8		9.4	45.3	45.6		9.3	31.8	26.1		9.2	54.5	26.6	R
9.5	40.2	5.2		9.4	5.4	45.5		9.5	11 18.3	43.2		9.1	46.5	14.2		9.5	58.1	55.5	
9.5	55.4	37.9		8.6	15.8	49.8		8.9	19.4	3.9		9.5	58.3	7.0		8.5	41 7.3	0.9	A
9.4	58.6	2.5		9.1	23.5	22.0		9.5	36.0	47.9		7.0	27 17.6	57.3	A	9.1	27.6	28.8	R
9.5	44 0.0	34.9		9.1	29.1	25.2		9.5	53.9	19.8		9.1	29.2	30.0		9.4	31.4	29.6	B

401—460			
	1h—2h	+53°	
m	′ ″	′	
8.4	41 37.3	19.6	R
8.7	42 18.1	8.9	
9.3	25.5	38.2	
9.2	44.6	38.4	R
8.4	43 2.9	10.6	R
9.0	29.0	9.2	B
9.4	36.0	9.2	
9.5	43.3	34.1	
9.5	44 3.5	40.6	
9.5	17.6	36.0	
8.7	19.4	11.7	R
9.5	20.9	5.8	
9.0	21.6	31.6	R
9.5	45.7	41.7	
9.4	45 6.5	19.9	
8.2	13.3	10.8	R
9.5	19.1	44.6	
9.2	25.4	39.6	B
7.0	30.8	28.4	B
8.5	46 17.5	36.9	
9.5	38.4	18.7	
9.4	40.5	26.4	
9.5	47 17.3	51.3	
9.5	46.2	27.6	
9.5	58.4	38.6	
9.5	48 6.2	56.3	
8.8	38.3	38.1	
8.9	40.5	53.9	
9.4	51.5	22.6	
9.4	57.7	11.8	
9.4	49 1.8	50.2	
9.5	50.3	24.8	
9.4	50 7.6	23.4	
9.5	13.5	41.6	
9.5	30.0	44.2	
9.2	51 25.6	19.0	
9.0	52 18.6	18.4	
8.9	22.4	43.2	A
5.0	41.6	47.4	A
7.9	53 47.7	59.7	G
9.5	58.0	50.4	
9.3	54 3.6	17.6	
9.5	17.0	36.8	
9.4	32.4	57.4	
9.5	55 0.6	42.5	
9.5	1.5	34.2	
9.3	56 7.7	42.5	
9.4	30.6	16.1	
9.5	54.0	53.7	
9.5	57 2.3	6.2	
8.0	3.1	36.4	G
9.2	59.0	53.5	
8.8	58 36.7	53.7	
9.4	56.5	3.3	
9.4	59 18.7	20.5	
8.9	35.7	38.3	G
8.9	48.3	56.2	
9.5	0 13.1	47.0	
8.5	20.1	38.7	G
6.0	24.6	10.0	G

461—520			
	2h	+53°	
m	′ ″	′	
9.5	0 30.0	48.0	
8.7	51.4	25.7	
9.5	56.6	11.8	
9.5	1 7.6	12.9	
9.5	38.4	38.9	
9.4	47.0	29.4	
9.3	49.8	56.7	
9.5	52.2	25.3	
9.5	54.5	58.5	
8.8	59.0	51.9	
9.5	2 24.0	57.4	
9.5	44.6	35.4	B
9.5	3 19.7	58.7	
8.1	26.5	31.3	S
9.5	30.4	29.5	
9.5	30.6	36.5	
9.2	57.0	11.6	
9.5	59.5	0.0	
9.4	4 1.5	2.9	B
8.9	5.5	13.6	
8.4	30.0	9.6	B
9.4	51.5	24.0	
9.2	53.7	46.8	
9.4	56.0	38.2	
9.2	57.2	21.7	B
8.5	5 3.1	51.1	B
9.4	13.0	36.4	B
9.4	6 33.7	2.8	
9.1	41.0	14.3	
9.5	7 0.1	27.9	
9.5	30.5	27.9	
9.5	38.7	56.7	
8.4	59.3	53.6	A
8.4	8 4.1	47.6	A
9.0	18.0	3.1	A
9.4	23.5	31.8	
7.5	31.8	36.7	G
9.5	55.9	17.1	
9.5	57.6	8.2	
9.5	9 1.1	48.5	
9.0	5.0	25.2	G
9.5	29.9	15.5	
9.5	41.0	41.5	
8.8	10 34.6	31.3	
9.2	38.0	2.1	A
9.5	11 9.8	33.2	
6.5	16.1	50.8	A
9.5	37.7	0.4	
9.5	40.8	41.5	
9.5	43.3	50.8	
9.2	43.6	46.8	B
9.5	46.4	4.3	
8.6	54.0	34.7	A
9.3	12 44.9	31.6	
9.5	48.1	49.5	
9.5	13 12.6	20.5	
9.0	36.1	5.0	A
9.0	14 12.0	33.1	A
8.2	17.5	32.7	A
9.5	24.3	54.2	

521—580			
	2h	+53°	
m	′ ″	′	
8.2	14 25.7	7.1	A
9.5	15 22.7	53.1	
9.3	28.1	1.1	A
9.1	59.9	17.0	
8.9	16 24.6	27.9	
8.2	28.5	38.6	S
8.5	31.1	29.3	
9.4	17 31.6	37.2	
8.8	18 11.5	43.9	S
9.0	15.5	45.1	B
8.5	19 16.6	13.1	
8.0	20 0.4	12.1	B
9.4	32.5	22.4	B
9.3	49.3	12.7	
9.4	50.4	18.1	B
9.5	21 39.1	16.1	
9.3	56.7	0.8	
9.0	22 8.2	36.5	
9.0	22.0	39.7	
9.0	43.6	19.4	
7.5	48.5	54.8	A
9.4	53.0	50.6	
9.1	56.3	3.5	
9.5	23 46.1	40.7	
9.5	24 17.3	27.4	
8.5	25 25.9	2.8	
8.5	26.8	41.7	
9.4	26 2.5	2.2	
9.5	28.1	47.1	
9.5	49.6	22.8	
9.4	28 23.5	24.3	
8.8	36.5	47.6	
9.5	30 3.7	9.4	
9.0	13.1	38.7	A
9.3	43.7	4.2	B
9.0	31 0.5	17.0	A
8.4	5.0	54.1	
9.5	6.1	36.4	
9.4	28.2	37.9	
8.7	32 8.0	33.2	B
9.5	8.1	53.2	
9.4	47.9	29.6	
9.5	34 10.8	18.2	
9.5	12.9	10.0	
9.5	35 28.7	26.1	
9.1	36 0.2	17.8	
6.8	19.6	27.1	A
6.8	37 19.7	19.8	A
8.3	25.8	29.6	A
9.4	27.0	34.6	B
9.3	32.5	7.2	
8.0	35.0	16.3	A
9.5	38 23.2	49.0	
7.8	27.0	32.0	A
9.5	39 18.2	58.5	
8.5	23.7	18.8	A
9.3	33.9	3.9	
9.5	51.8	19.3	
9.5	41 10.6	54.5	
8.9	42 3.2	25.4	

581—640			
	2h—3h	+53°	
m	′ ″	′	
9.2	42 19.0	19.8	
9.1	23.1	23.4	
8.7	29.8	7.0	
9.5	34.8	56.1	
9.5	46.2	4.0	
9.5	43 6.0	29.5	
7.8	19.1	11.8	R
9.5	44 4.5	42.0	
8.7	22.4	57.1	
8.8	31.8	49.7	
9.4	45 6.4	5.8	
9.5	26.4	32.5	
9.5	46 57.2	15.8	
8.3	47 1.6	45.7	
8.5	21.5	49.1	
7.7	48.6	12.7	A
9.5	57.0	50.4	
8.6	48 19.5	42.1	A
8.5	41.4	47.3	
9.3	49 11.3	32.8	
8.5	14.8	45.1	A
9.4	22.1	30.3	
9.5	54.6	34.9	
9.2	51 24.7	9.7	A
9.2	41.3	32.9	
7.3	52.4	47.0	A
8.5	52 15.0	42.0	A
9.3	24.2	23.2	
9.5	54 30.0	49.8	
9.5	55 17.5	25.8	
9.3	39.1	25.4	
9.0	50.8	53.9	
8.8	56 47.7	32.9	A
9.5	49.9	51.8	
8.0	53.3	32.5	A
8.5	54.0	55.3	
9.3	55.9	54.4	B
9.2	57 22.4	47.1	B
9.4	24.4	49.6	B
9.5	38.2	44.0	
9.2	46.2	16.1	
9.5	58 57.1	31.9	
9.5	59 3.1	25.4	
8.4	19.1	37.5	A
9.4	22.0	9.9	
9.5	0 2.9	43.2	
9.5	13.5	13.8	
9.5	1 3.5	45.4	B
9.3	8.6	8.4	B
9.5	12.8	17.4	
9.5	25.9	57.9	B
9.5	2 16.2	15.6	
9.1	47.3	48.3	
9.4	3 5.5	48.6	
9.5	46.4	5.8	
9.5	4 13.5	53.8	
9.5	21.9	17.1	
9.5	7 12.2	36.4	
8.5	14.6	20.5	A
9.4	14.8	50.0	

641—700			
	3h	+53°	
m	′ ″	′	
9.5	8 19.0	56.6	
7.5	54.1	35.5	A
8.0	55.4	11.2	A
9.5	9 18.2	6.4	
9.4	44.1	37.1	B
9.5	10 11.4	38.7	
8.8	31.8	36.4	A
9.4	35.1	37.8	
9.0	35.2	31.6	A
9.5	11 14.2	41.0	
8.3	59.0	58.7	
8.7	13 2.2	43.7	
9.4	38.4	50.3	
8.7	52.0	3.8	
9.5	52.5	26.7	
8.7	14 0.0	33.8	
6.3	15 0.9	24.6	A
9.5	9.8	27.0	
9.5	39.0	2.4	B
9.5	59.4	49.3	
9.5	17 18.1	12.8	
9.5	34.5	16.7	
8.7	59.4	41.0	
9.5	18 27.3	29.7	
9.5	19 17.5	29.9	
8.7	31.2	46.8	A
8.9	49.6	9.3	A
9.4	20 20.1	19.5	
9.4	32.3	9.2	B
9.5	32.9	9.8	
9.5	21 21.6	12.0	
8.8	26.6	59.5	
9.3	28.3	6.5	
9.2	41.6	54.2	A
8.4	50.2	45.1	A
9.5	22 55.3	48.3	
9.5	23 3.4	8.0	
8.8	37.7	5.6	
8.8	59.2	27.0	A
9.3	24 38.9	25.4	A
9.5	25 5.8	49.2	
9.1	57.4	6.0	
9.2	26 10.2	17.0	A
8.4	11.9	29.2	A
9.5	21.6	47.5	
9.5	23.5	38.8	
9.5	47.9	58.8	
9.1	58.5	15.2	A
9.2	27 18.3	36.9	
8.3	37.2	23.1	A
9.0	30 3.8	31.1	A
9.5	8.3	6.7	
9.3	31 42.3	46.1	
9.0	32 19.5	38.5	
9.5	27.5	51.0	
9.0	49.7	4.0	
9.5	34 56.9	33.4	
8.0	35 4.1	27.1	A
9.4	36 25.1	29.9	B
8.6	42.8	39.4	A

701—760				761—820				821—880				881—940				941—1000			
	3h—4h	+53°			4h	+53°			4h—5h	+53°			5h	+53°			5h—6h	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	37 42.0	31.2		9.0	10 26.6	55.0	A	8.7	39 27.4	28.8	A	8.8	5 34.1	0.3	A	8.5	33 45.2	13.4	A
9.0	43.7	22.7	A	9.4	12 4.9	37.2		9.3	41 3.6	57.0		var	35.9	25.2		9.4	34 37.6	43.7	B
9.5	38 17.8	22.5		9.3	37.4	15.5		9.5	42 47.5	5.0		9.0	50.5	40.3		9.5	47.8	36.8	
9.5	39 8.0	52.3		7.0	45.3	9.6	A	9.1	55.4	20.4		8.8	52.1	30.6	B	9.5	54.7	16.3	
8.7	40 15.8	6.4	A	9.0	14 5.0	4.8		9.4	43 13.5	7.6		9.5	6 13.0	13.6		9.5	36 9.7	27.5	
8.2	36.0	40.0	A	8.0	34.0	26.7	B	9.5	37.9	26.3		9.5	23.3	7.2		9.4	16.3	41.6	
9.5	41 4.1	29.6		9.2	40.3	49.5		9.5	50.9	30.4		9.5	35.6	31.9		9.5	37.8	2.5	
8.0	45.8	2.8	A	8.4	54.2	16.4	A	9.1	45 39.9	13.5		9.0	8 9.1	48.6		8.9	42.2	44.8	B
9.5	42 11.7	50.9		8.5	15 7.9	9.1	A	5.0	41.3	30.3	A	9.5	58.0	50.0		8.6	47.4	43.6	B
9.5	43 3.1	38.9		9.4	16 10.2	6.4	B	9.5	46 12.8	44.1		9.2	10 9.6	10.8		8.5	37 9.6	57.9	P
9.5	44 16.5	57.4		8.5	17 5.2	6.5	A	9.4	27.2	40.3	B	9.0	59.3	22.9	A	9.0	53.0	28.0	
8.5	19.5	7.1		8.4	13.1	35.2	A	9.5	28.2	41.5		9.0	11 8.1	28.9	A	8.8	39 0.3	58.8	
9.0	29.3	26.8		9.0	18 32.9	32.7	B	9.5	50.3	11.1	B	9.4	11.6	40.2	A	9.0	11.9	26.5	
9.5	45 26.0	58.7		9.0	47.4	23.2		9.4	47 48.0	21.8		9.2	21.6	30.9	A	8.9	15.4	8.9	
9.5	46 28.4	14.7		9.5	19 16.5	42.1		9.5	48 9.8	49.4		9.0	35.1	50.6	A	8.9	31.5	22.8	
9.5	47 5.0	44.3		9.0	29.6	43.6	B	8.0	20.0	12.6	A	9.0	39.0	56.5	A	9.5	59.2	51.9	
8.8	25.2	39.3	A	9.1	35.5	39.0		9.5	45.9	13.4		9.0	57.8	12.1		9.0	40 10.2	46.1	
6.8	27.8	34.3	A	9.0	20 11.9	29.7		9.1	49 24.4	21.2	B	8.9	12 8.5	25.4	A	9.2	41 12.0	52.8	B
9.5	48 42.9	28.8		6.0	34.4	35.7	A	9.4	31.7	22.0		9.3	18.0	55.3	B	9.3	16.7	16.3	A
9.5	48.1	59.9		9.5	57.9	54.8	B	9.3	50 5.6	41.2		9.5	13 8.6	8.8		9.5	42 6.0	36.4	
9.5	49 1.6	36.3		9.3	59.3	1.9		9.4	59.0	10.7		8.5	9.6	47.1	A	9.0	43.1	56.9	A
6.8	50 26.1	27.1	A	9.4	21 30.4	32.7		8.6	51 9.0	32.4	A	9.5	27.0	36.6		8.0	43 50.7	25.5	A
8.9	51 4.9	19.5	A	9.2	46.5	28.2		8.7	51.6	17.1	A	9.0	59.1	8.8		9.0	54.3	25.0	B
9.4	51.0	42.6		9.1	53.4	48.0		9.3	52 3.0	19.6	A	9.5	14 16.4	35.3		9.5	59.0	2.0	
9.4	52 23.7	22.6		9.4	23 13.5	15.0		8.8	15.0	1.5	A	9.5	49.0	28.4		9.5	44 16.2	49.1	
9.5	53 4.9	7.7		9.2	24 29.9	11.6		9.3	33.0	11.3		8.1	15 41.5	27.7	A	8.2	35.3	32.0	A
9.4	54 0.0	45.5		9.5	25 24.7	59.7		9.4	53 44.0	21.1		8.7	51.1	38.3		8.5	49.9	18.6	A
9.4	27.1	28.3		9.1	28.5	9.9	A	9.3	46.8	7.7	B	9.2	16 0.1	55.9	A	9.5	45 4.4	54.0	
9.5	46.6	2.6		9.2	26 18.5	28.7		9.2	49.2	10.1	B	9.2	14.8	23.0		9.5	16.5	20.7	
8.4	52.7	11.3	L	8.5	18.9	10.1	A	8.7	55 5.1	18.6	A	9.3	29.7	58.9	A	9.2	16.9	34.4	
9.5	55 2.0	2.5		9.0	33.0	43.0		9.0	10.2	29.9	A	9.3	42.2	56.4	A	9.0	44.0	58.1	
6.0	20.6	37.0	L	9.5	36.2	2.0		9.5	21.0	18.1		7.3	18 12.6	17.3	A	9.1	52.7	51.7	
9.2	42.1	47.4		8.4	48.9	28.8	A	8.0	56 16.2	0.7	A	9.5	42.3	31.5		9.1	46 29.7	19.7	
9.5	45.4	49.8		5.4	28 29.8	10.5	A	8.5	57 17.5	38.8	L	8.8	55.1	32.4		9.5	33.3	48.1	
9.4	56 33.3	53.3		9.5	38.4	31.3		9.4	31.2	52.8		7.7	19 3.0	2.0	A	9.1	47 18.9	51.4	
9.4	57 31.8	44.9	B	8.8	55.9	10.6	B	9.5	56.6	32.1		9.3	10.1	51.1		8.7	45.2	31.8	
9.5	42.0	43.4		9.5	30 21.4	32.3		9.5	58 25.0	27.4		8.2	30.3	13.4	A	9.4	59.6	17.0	B
8.0	58 36.9	28.8	A	9.5	29.8	58.3		8.1	28.1	31.0	G	9.5	20 7.7	22.6		9.1	48 46.3	11.9	
9.0	59 11.1	7.6	A	8.3	31.3	17.5	A	9.5	41.2	21.9		9.1	32.8	34.8		9.3	50 3.0	16.9	
9.5	42.5	11.2		9.5	31 34.5	55.3		9.4	59 10.0	40.8		9.5	21 37.2	27.6		9.5	45.8	1.2	
9.5	0 21.5	44.6		9.0	51.4	47.0		9.5	51.2	51.5		9.4	22 30.7	8.8	B	7.0	51 21.8	31.2	A
9.3	1 27.8	23.5	B	8.8	51.7	27.3		9.5	53.6	29.4		9.5	54.3	37.8		9.1	34.2	11.9	B
8.8	37.9	18.9	A	9.4	32 39.9	25.9		7.9	54.5	1.3	A	9.3	23 0.0	34.0		9.0	39.7	46.0	A
8.5	45.2	21.6	A	9.5	45.4	15.0		7.5	0 18.0	15.6	A	9.3	2.2	10.7		9.2	45.4	15.7	
9.5	2 25.0	52.3		9.3	57.8	18.3		9.5	36.8	7.8		9.5	27.9	18.7		8.5	52 33.4	32.8	A
9.0	40.8	59.3		8.8	58.0	24.2	A	9.2	1 20.4	56.8	A	9.5	59.4	39.8		9.0	57.1	49.7	A
9.3	3 0.7	59.3		9.0	33 37.6	11.5	A	9.4	43.6	27.1	B	9.5	26 54.6	40.2		9.5	53 46.8	13.0	
8.2	57.8	20.4	A	9.0	55.2	22.0	B	9.0	51.6	22.4	A	8.5	27 12.9	28.4		9.5	54 53.7	9.0	
9.5	4 0.0	5.3	B	9.5	34 55.9	30.8		8.0	2 26.7	50.3	A	9.0	42.4	46.8		8.0	56 33.8	8.5	F
5.0	5 25.9	14.0	A	9.5	57.5	58.2		9.5	56.3	37.4		9.0	28 18.5	26.3		9.4	57 1.0	13.4	
8.2	6 32.8	37.4	B	9.3	59.0	15.0		9.3	58.0	59.8		9.5	29 3.7	57.9		9.3	58 27.5	11.0	
9.5	7 8.3	59.3		9.4	35 34.4	49.8		6.5	3 8.4	1.6	A	9.5	16.2	52.4		9.5	59 8.6	6.6	
9.5	13.5	0.0		7.0	36 20.9	1.4	G	9.5	9.6	44.7		9.5	20.0	41.1		9.0	8.6	30.6	A
8.0	22.4	9.6	G	9.4	37 12.4	30.8		9.2	13.4	3.1	B	6.3	36.6	24.3	A	8.0	19.1	38.4	[illegible]
9.5	8 4.9	25.3		9.4	17.5	23.8		9.5	25.1	48.2		9.4	46.7	26.6	A	9.1	32.8	17.[illegible]	
9.5	9 20.8	45.2		9.5	46.7	47.7		9.5	4 24.5	21.1		9.4	50.6	14.1	B	9.5	39.8	6[illegible]	
9.5	26.0	38.0		8.5	54.4	36.7	A	9.5	53.3	0.0		9.5	30 24.0	16.2		8.2	0 3.3	5[illegible]	
9.5	35.2	31.3		7.8	38 1.7	6.3	B	8.3	5 4.0	18.1		9.1	34.1	25.4	A	9.4	1 53.7	4[illegible]	
8.0	10 0.6	20.5	A	9.4	10.9	47.8	B	9.0	10.6	8.6		9.2	41.7	27.5	A	9.4	2 58.8		
9.3	6.1	19.9	B	9.5	39 12.2	10.2		9.0	31.0	24.6	B	9.4	31 24.7	34.4		9.3	4 32.5		

1001—1060				1061—1120				1121—1180				1181—1240				1241—1300			
	6h	+53°			6h—7h	+53°			7h	+53°			7h—8h	+53°			8h	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.7	4 35.9	31.2		9.2	34 33.9	30.1		8.0	3 4.2	49.7	A	9.4	34 25.0	16.0	B	9.3	11 52.8	50.1	B
9.1	5 15.2	40.3		9.1	35 12.5	59.3		9.3	5.9	50.9	A	9.4	42.3	3.8		9.3	54.3	31.5	A
7.5	6 19.3	41.8	A	8.9	17.9	41.0	A	8.9	37.2	54.6		9.3	35 35.8	59.7		9.4	12 11.9	2.3	A
9.5	40.7	31.5		9.5	43.0	7.2		9.5	50.4	38.5		9.4	36 20.3	11.2		9.5	14.5	59.1	
9.0	41.4	41.2	S	9.5	36 13.0	40.5		9.5	55.4	45.3		9.2	25.0	26.9		8.8	40.8	27.0	A
9.5	7 30.0	30.6		9.4	42.4	40.5		9.5	5 5.8	0.8		9.2	30.4	37.3		6.0	49.7	40.5	A
9.4	9 46.2	15.2		9.1	48.6	16.5	A	9.1	6 10.5	48.7		9.3	46.3	3.8		8.9	14 19.3	16.3	
5.8	10 1.2	30.5	G	9.5	37 55.5	2.1		8.8	50.4	34.4		9.1	37 5.8	19.0		9.2	15 6.5	6.9	A
9.2	30.6	38.6		7.8	59.2	11.0	A	9.5	7 6.9	24.8		8.9	7.3	31.2	A	9.5	13.6	26.5	
9.3	54.8	45.8		8.5	38 9.4	55.8		9.5	9.7	51.6		9.2	48.4	6.0		9.5	16 46.3	12.8	
7.5	11 46.8	7.1	F	9.4	39.9	17.8		9.5	15.2	47.3		9.1	38 19.5	54.7	A	9.5	48.4	30.2	
9.5	58.2	56.0		9.3	48.5	37.1		9.4	8 42.5	28.8		9.5	46.3	36.4		7.7	57.8	55.5	A
8.2	12 10.7	17.8	F	9.3	39 8.2	42.4		9.0	10 11.2	34.2	B	9.4	39 56.5	18.5		8.7	17 43.7	40.6	A
9.4	13 10.0	47.2		9.3	8.8	36.2		9.2	12.2	32.7		9.3	41 39.8	58.5	B	9.1	58.2	16.3	
9.5	19.2	44.1		8.7	13.7	8.0	A	9.4	13.6	24.4		8.5	42 33.3	8.7	A	8.7	59.3	27.0	A
9.4	58.1	13.0		9.4	28.0	31.7		9.3	11 6.9	0.3		9.3	52.8	11.7	A	9.5	19 7.5	34.2	
8.5	14 4.2	7.9	A	9.3	40 11.3	11.8		9.4	8.2	25.1	B	9.2	43 9.5	21.7	A	9.5	40.9	7.5	
9.1	8.8	49.3		9.5	14.6	43.4		8.0	10.8	7.2	A	9.5	44 27.3	7.1		8.5	20 30.8	36.4	A
9.5	58.7	30.9		9.5	37.0	43.7		9.3	12 39.0	50.4	A	9.2	45.9	21.7	A	6.4	21 41.6	35.4	A
9.4	15 26.5	27.2		9.2	41 18.5	32.0		9.2	55.4	55.1	A	8.8	46 56.3	16.1	R	9.5	23 2.0	23.3	
9.4	30.3	57.0		9.0	42 25.9	32.7		9.3	14 28.6	27.8	A	9.5	47 55.4	6.7		9.4	9.1	6.9	
9.1	33.7	0.1	A	9.4	43 21.7	28.0		9.5	44.3	28.8		9.5	48 16.2	14.5		9.1	29.3	39.6	
9.5	16 8.7	25.5		8.9	44 22.0	37.6		8.9	15 15.4	3.7	A	8.7	33.3	44.9	A	9.5	24 22.8	19.8	
8.3	17.3	7.9	A	9.5	22.2	15.4		8.4	32.4	29.5	B	9.4	46.7	51.3	A	9.3	25 20.3	6.5	
9.2	17 35.4	14.3		8.5	45 49.2	1.6		9.2	42.8	3.8	A	9.5	55.0	22.2		9.5	24.9	29.7	
9.5	18 10.9	56.0		9.5	53.0	20.8		8.7	16 16.2	47.3	A	9.3	49 15.3	50.8		8.8	26 19.2	6.0	A
9.2	42.4	0.0		9.5	46 37.8	8.4		9.1	23.3	14.0	A	9.1	42.7	22.9	A	9.1	45.4	13.3	A
9.3	19 0.8	50.2		9.5	55.2	12.0		9.5	28.5	48.6		9.3	50 52.1	34.4	B	6.8	27 31.1	52.9	A
9.0	17.0	55.0	A	9.5	48 42.8	14.3		8.9	17 12.4	28.5	A	9.4	51 16.4	24.4		6.6	28 14.0	24.8	A
9.2	26.8	56.5		8.6	49 32.7	16.9	A	9.4	23.6	46.8		9.3	52 9.3	53.7	A	9.4	14.9	37.6	
7.9	29.4	51.1	A	9.3	53.0	43.0		9.5	57.0	58.1		7.7	20.8	9.2	A	9.1	16.0	57.4	A
9.2	20 19.0	10.2		9.0	50 44.4	10.5		9.0	18 50.1	10.7		8.7	26.9	35.8	A	6.4	31.6	12.7	A
9.4	56.0	19.3		9.5	53.2	9.5		9.3	19 11.2	14.6		9.4	52.8	41.0		9.4	49.6	13.9	B
9.1	57.8	36.4		7.4	53.2	34.5	L	9.4	43.0	2.7		9.5	53 7.4	21.9		9.2	29 49.8	38.3	A
9.0	21 44.2	44.3	A	9.3	51 32.8	8.8	B	9.4	46.5	0.5		9.1	54 40.5	15.1		9.2	30 52.4	17.5	A
9.4	22 29.3	49.3		9.0	55.5	37.5		9.5	20 12.3	34.3		9.3	55 51.3	5.8		8.8	31 17.0	50.4	
9.5	23 32.8	21.8		9.5	53 8.0	7.9		9.0	16.2	57.6	A	8.9	56 8.6	42.9	R	9.3	33.5	18.0	
9.3	24 43.3	28.6		9.5	54 21.5	36.8		9.3	36.4	53.1	A	8.2	16.3	58.7	A	9.5	33 30.0	7.6	
8.0	25 29.9	35.2	B	9.5	30.4	40.5		9.1	21 4.2	26.0	B	9.5	22.3	41.0		8.8	34 55.9	11.6	
8.8	26 4.5	38.1	A	8.8	31.2	49.5		9.2	7.1	27.3		9.4	57 45.5	1.4		9.5	35 7.5	59.4	
9.5	20.4	19.2		8.8	55 19.3	15.8		9.3	14.2	17.2	B	7.0	0 2.8	39.9	F	9.0	55.8	34.7	A
9.5	27 18.0	32.4		8.5	56 9.7	41.8	B	9.5	22 6.3	28.3		9.3	1 52.9	46.8		9.5	36 26.9	29.3	
9.5	27.5	37.5		9.5	48.0	1.4		9.1	25.4	44.8		9.4	2 29.1	40.9	A	9.3	54.5	51.9	
9.5	41.2	10.5		9.5	53.4	51.0		8.5	46.2	52.7	A	8.5	3 52.2	22.1	A	9.3	37 46.5	26.0	
9.5	47.1	25.4		9.5	57 11.4	46.2		9.5	24 45.4	8.1		8.6	4 28.2	41.8	A	8.3	38 0.2	27.5	P
9.5	58.1	39.7		8.9	13.3	19.7		9.3	25 10.4	54.1		8.4	6 21.9	21.8	A	9.0	41 9.9	2.2	A
9.2	28 2.0	56.3		9.0	20.8	54.3	B	8.7	26 23.5	40.3		9.5	31.6	9.5		9.5	42 28.8	21.6	
9.5	26.7	29.8		9.5	22.5	14.7		9.5	23.8	5.7		9.1	7 26.5	16.3		9.1	43 11.7	27.5	
7.6	29 21.8	31.0	A	9.3	58 21.0	27.0		9.0	27 44.5	44.9		9.4	8 32.6	43.4		9.5	44 16.0	47.1	
9.4	30 27.5	30.3		9.0	37.7	42.8		8.9	50.9	36.4		9.0	39.8	11.5		8.0	22.1	29.5	L
9.0	38.2	1.6		8.4	53.8	28.5	A	8.7	28 28.8	0.8	A	9.5	43.4	43.4		7.3	24.2	21.0	L
9.4	39.4	53.1		9.0	59 22.5	25.3	A	9.3	45.3	57.7		7.7	9 4.3	38.7	B	8.5	45 37.6	36.1	A
9.5	31 17.7	24.2		9.4	0 31.7	36.5		8.7	51.4	51.8	A	9.4	4.8	0.5	A	9.4	38.0	29.1	
8.5	23.2	1.6	A	9.4	1 0.5	11.3	A	9.4	59.2	37.8		8.7	12.6	31.1		9.5	46 36.4	40.1	
9.0	29.8	10.0		9.2	9.5	17.2	A	9.0	29 24.2	0.9	A	9.5	54.4	55.1		9.5	46.3	28.8	
6.5	32 28.4	25.7		9.4	57.7	44.4		9.5	45.3	46.4		9.5	10 32.0	26.1		9.5	47 1.5	11.0	
9.1	33 12.7	36.5		9.3	2 5.8	36.9		8.2	30 18.9	30.2	B	9.5	57.3	41.8		9.4	26.1	13.8	B
7.3	35.1	12.9	A	9.5	7.4	33.6		9.2	32 26.2	6.3		9.1	59.4	1.6	A	9.4	39.5	47.1	
8.5	34 4.4	46.4	A	9.3	43.7	4.2	A	9.5	26.3	29.7		8.5	11 46.2	31.7	A	9.5	49 15.4	22.3	
9.5	5.4	37.6		9.5	3 2.3	22.3		9.1	44.4	35.1	A	9.2	51.2	5.0	A	7.9	42.9	53.4	B

1301—1360				1361—1420				1421—1480				1481—1540				1541—1600			
	8ᵘ—9ᵘ	+53°			9ᵘ—10ᵘ	+53°			10ᵘ—11ᵘ	+53°			11ᵘ—12ᵘ	+53°			12ᵘ—13ᵘ	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	50 33.9	14.0	A	7.2	39 56.6	33.8	B	9.5	26 38.4	29.1		9.5	9 20.6	30.0		8.3	16 13.4	59.9	A
9.5	51 17.5	56.9		9.1	40 50.3	29.8		8.8	28 57.8	57.7		9.5	45.3	58.2		9.4	36.9	3.1	A
9.4	30.8	6.2		9.0	52.6	48.1	A	9.5	29 11.8	17.7		9.5	10 39.3	33.2		9.5	52.2	52.9	
9.0	52 43.4	19.5	A	8.8	41 17.6	53.1	A	8.6	15.5	24.5	A	9.5	11 12.5	4.9	B	9.5	17 54.0	39.5	B
7.0	53 2.7	40.3	A	9.1	42 1.0	22.7		9.5	30 53.0	14.3		9.0	13 24.9	37.2		9.0	18 34.9	41.1	A
9.5	47.8	20.9		8.7	18.2	49.3	B	9.5	31 47.6	11.8		9.0	35.8	21.8		9.5	55.2	14.8	
9.0	54 25.1	50.9	A	9.5	30.2	48.6		7.0	32 19.8	43.5	A	9.1	15 1.1	12.6		8.2	19 7.6	28.8	B
8.4	55 56.0	49.5	A	9.2	31.2	37.9	A	9.4	33 1.0	8.4		9.4	17 32.6	50.9		9.3	10.4	52.9	
7.3	56 21.3	32.7	A	8.8	43 8.7	16.4		9.4	3.4	11.3		9.3	19 46.0	22.3		9.1	30.7	16.9	
9.0	28.6	2.7	B	9.5	44 25.7	1.6		9.2	34 17.6	3.5	A	9.3	20 54.5	55.4		9.3	21 54.9	51.0	
9.5	34.8	27.8		9.1	25.8	16.3		9.4	48.8	53.9	A	9.4	21 1.5	33.0		9.3	22 16.0	51.0	
8.4	57 39.5	50.4	L	9.4	56.3	28.0		7.5	35 32.5	10.3	A	8.8	22 25.0	25.1	A	9.5	37.3	35.4	
8.0	58.4	51.5	L	9.5	48 0.8	33.3		9.5	37 27.6	3.5		9.5	23 11.4	12.3		9.4	52.8	48.6	
9.4	0 10.5	38.9		9.5	49 7.1	52.7		9.5	39 12.7	31.2		9.5	39.9	11.8		6.5	23 56.8	51.5	A
9.0	1 22.9	20.2		8.3	22.1	57.5	A	9.5	50.2	32.1		9.5	24 31.5	49.1		9.5	25 19.0	39.4	
9.5	38.2	13.0		9.4	50 27.9	14.5	A	7.7	41 37.3	2.9	A	9.2	40.1	35.3		9.5	26 39.7	10.0	
9.5	2 13.8	12.5		8.7	51 1.6	46.2	A	9.2	59.8	16.5		8.8	58.4	21.3	A	9.5	27 15.5	12.4	
9.2	55.8	36.5	B	7.5	13.1	49.2	A	9.5	42 28.0	31.5		9.4	26 0.7	33.3		9.1	29 30.9	54.5	B
8.9	3 6.9	37.7	R	9.5	52 24.3	34.1		6.2	43 47.5	19.7	A	9.2	28 54.3	12.8	A	9.1	34.4	33.0	
8.0	4 27.1	18.2	B	8.5	27.1	5.2	A	6.0	49.5	16.7	A	9.5	58.5	18.2		9.5	30 30.5	49.1	
8.0	29.0	18.4	B	9.3	31.8	40.7	B	9.3	45 2.2	29.2		9.5	30 43.9	13.3		9.5	38.9	9.6	
9.0	5 55.7	10.0	A	9.5	54 0.9	30.8		9.0	15.4	34.8	A	9.4	31 26.9	33.3	B	9.4	33 24.5	50.5	
9.0	6 1.2	13.0	A	9.1	2.6	56.5	A	8.8	57.9	9.4	A	8.0	32 28.2	3.0	A	9.5	35 20.8	30.2	
9.4	10.0	51.3	A	6.5	55 38.9	3.3	L	8.5	47 58.2	55.2	A	9.3	33 37.5	41.1	A	9.5	37 29.3	54.0	
9.3	48.7	2.6		9.5	57 15.2	41.5		8.5	48 19.6	9.9	A	9.2	35 10.1	56.4		8.9	38 24.4	9.8	B
8.7	7 3.5	30.7	A	9.3	32.4	25.4		9.0	20.2	12.3		7.0	58.4	12.8	L	9.2	40.4	55.5	
8.5	4.2	16.9	A	8.0	58 10.6	55.0	L	8.9	21.9	43.9	A	9.5	36 28.0	45.6		9.0	47.3	54.0	
8.8	8 40.1	5.5	A	8.5	44.8	47.2	L	9.0	34.4	40.6		8.8	38 29.8	10.9		7.3	40 47.2	39.1	A
9.1	55.0	18.4	A	9.5	45.4	20.5		9.5	45.0	14.2		9.4	39 32.7	37.8		6.5	41 39.1	14.4	A
7.0	10 16.7	4.0	A	9.1	58.5	51.6		8.4	49 25.8	11.8	A	9.4	51.4	51.1	B	9.5	42 18.0	36.3	
9.5	57.9	51.0		8.0	59 38.6	45.2	A	9.5	50.6	24.5		7.8	40 9.6	49.2	A	9.1	45 2.7	18.9	A
8.5	12 19.7	32.6		9.4	45.0	33.3	A	9.5	57.8	53.1		9.5	42 12.0	21.0		9.5	29.1	7.0	
9.2	30.0	52.4		9.5	0 43.5	2.2		8.4	51 11.0	2.4	A	9.5	47 57.1	59.5	B	9.5	46 16.8	1.6	
9.4	34.9	29.7		9.1	1 3.5	45.2	A	9.3	48.0	23.0		9.2	48 36.7	39.5		9.5	47 22.4	33.3	
9.0	13 5.0	54.2		9.2	4 29.5	15.1	A	7.1	53 2.5	29.7	L	9.5	40.8	13.2		9.5	56.5	22.2	
9.4	17 49.8	11.2		9.5	5 8.2	34.8		9.5	11.2	32.2		8.4	49 17.8	53.6	A	9.5	48 6.7	16.7	B
9.3	57.5	9.9	B	8.0	8 10.1	0.8		8.0	53.9	59.2	B	8.5	20.8	5.6		7.5	49 16.3	31.8	B
9.5	19 56.3	12.5		9.2	32.4	22.2		8.0	54 29.6	4.2	A	9.2	50 30.4	23.8		9.4	21.4	34.8	B
8.8	20 29.5	25.7	A	9.5	11 7.4	36.9	B	9.1	55 35.1	7.7	A	9.3	51 6.2	23.5		9.0	30.4	52.4	A
9.4	22 3.9	9.1		9.5	12 33.6	10.3		9.5	54.2	53.7		8.7	53 46.7	37.0	A	8.8	51 18.2	10.4	A
9.1	7.8	32.3	A	9.5	13 10.9	51.5		9.4	57 2.8	9.3		9.3	54 42.5	18.7	A	8.3	45.6	20.1	A
9.0	24.4	44.9	A	9.3	14 33.4	47.4	A	9.3	19.0	28.1		9.5	54.3	12.7		9.3	58.5	34.1	B
9.3	28.2	13.1	B	9.3	40.0	37.4		7.2	24.3	6.5	B	9.4	55 4.4	1.1		9.0	52 42.3	47.1	A
9.3	23 16.6	23.6		7.5	16 49.2	22.0	A	8.8	55.2	59.2		9.5	57 46.0	34.8		9.4	53 2.3	33.2	
9.5	39.8	53.4		9.0	18 22.8	22.3		8.6	59 11.5	50.4		7.7	58 12.1	40.9	B	8.8	10.8	40.4	A
9.3	40.7	0.2		9.4	47.2	31.9	B	7.2	35.3	36.5	S	9.4	14.1	4.8		7.0	54 40.6	19.3	A
7.5	49.7	4.1	A	9.3	19 38.2	38.9	A	9.5	43.9	3.2		9.5	59 9.4	3.7		9.5	55 53.9	47.1	
9.3	51.4	56.8		8.9	57.5	22.6	A	8.9	0 6.1	24.8	A	9.5	0 39.7	32.8		8.6	56 6.8	10.9	A
9.3	24 1.0	17.9		9.1	20 13.7	14.7	A	9.4	1 1.5	15.0		9.5	51.0	8.1		8.7	12.5	1.2	A
8.2	25 38.6	57.2	A	9.0	18.6	39.6	A	8.5	2 57.3	49.9	A	9.0	2 2.8	22.9	A	9.4	57 4.9	56.4	
8.3	26 1.9	57.2	A	9.4	49.1	23.6	A	9.5	3 1.6	3.7	B	9.4	3 5.7	54.1	B	9.2	29.2	22.9	
9.3	28 8.7	13.9		9.5	58.2	30.0		9.0	2.2	33.9	A	9.3	4 46.1	28.8	A	8.8	58 0.4	14.0	B
8.0	31 6.7	16.4	L	9.5	21 39.5	11.8		9.0	27.0	20.0		9.0	5 9.4	36.4	A	9.5	4.9	38.4	
9.0	49.1	50.3	A	9.5	22 47.3	53.3		9.2	31.3	59.8	B	9.5	47.0	10.1		9.5	13.4	10.0	
9.0	32 5.1	53.1	A	9.5	24 16.6	32.0		9.5	50.2	50.9		8.3	8 16.3	31.5	A	9.4	19.2	7.1	
8.3	33 19.1	46.5	A	9.0	23.7	28.2		7.7	5 14.3	39.2	A	9.5	11 32.4	46.0	B	8.5	59 30.3	15.3	
8.3	41.6	39.5	A	8.6	30.3	58.3		9.5	39.5	8.2		8.2	59.9	14.9	A	9.4	46.7	57.1	
8.3	34 46.5	27.6	A	9.0	25 27.8	53.3		9.5	45.4	21.5		8.5	12 5.6	21.2	A	8.3	0 8.7	1.1	
9.3	36 36.3	27.6	A	9.0	26 3.8	9.1	B	7.2	6 12.9	43.7	A	9.5	13 49.9	55.4		8.8	38.9	42	
9.5	37 37.1	26.2		9.1	29.5	34.7		6.5	7 42.7	33.6	A	9.1	15 3.2	7.0		9.4	1 3.2	5	

1601—1660				1661—1720				1721—1780				1781—1840				1841—1900			
	13h		+53°		13h—14h		+53°		14h—15h		+53°		15h—16h		+53°		16h		+53°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.3	1	15.6	58.1	9.5	43	47.8	10.3	9.3	30	59.8	3.7	B	8.7	23	18.0	45.2	8.2	2	41.9	41.2	B
9.5		36.3	7.0	8.7	44	18.4	2.4	A	9.1	31	1.4	30.4		9.3		37.5	3.1	8.4		44.3	53.8	A
9.3	4	11.5	30.7	7.5	45	34.5	59.9	A	8.9		18.2	50.7	A	9.3	24	6.7	16.0	9.3		52.3	38.3	
8.6		13.3	12.1	7.2	46	24.6	33.4	A	9.5	32	34.0	21.4		9.2	25	47.1	34.8	B	9.5	3	48.6	0.1	
9.0		14.4	42.5	B	9.2		30.0	29.5		8.4	33	17.1	40.4		9.3		50.0	11.5	9.3	4	41.2	13.0	
8.9	7	16.1	38.3	A	9.5		36.0	22.6		8.8	34	16.1	53.2		9.2	26	16.9	36.2	A	9.4		42.2	30.7	
8.2	8	23.0	45.2	A	6.3	47	53.9	2.3	A	9.5	36	8.0	3.4		9.3		52.7	30.3	A	9.4	5	5.5	13.0	
8.3	9	8.6	2.9	A	9.2	49	2.3	21.7		8.2		38.8	16.1	B	8.5	27	39.9	49.6		8.0		43.7	17.4	L
9.5		35.0	22.6		9.0		35.8	19.0	B	9.4	38	24.4	34.9		9.4	28	56.5	51.2		9.5	6	5.0	34.8	
9.3	11	4.0	12.3	A	9.2		53.5	13.6		9.4		54.6	41.9		8.3	29	38.3	33.9		7.5		55.5	24.9	L
9.5		42.5	20.1		9.5	50	8.6	50.5		9.5	39	48.2	53.2		9.5		56.7	3.1		9.4	8	9.0	12.5	
9.5		46.1	49.6		9.3		28.9	17.2	B	9.5	40	0.5	10.0		9.4	31	10.6	50.6		9.5		29.4	52.8	
9.5	12	7.8	29.4		9.5		37.8	40.1	B	9.5	41	51.1	44.8		8.8		12.9	54.5		9.4		35.1	18.5	
9.4		47.5	3.4		9.2		48.0	8.3	A	8.2	42	54.1	25.9	B	9.5		31.5	22.8		9.4	10	41.0	9.5	
9.0	14	2.5	44.5	A	9.3	52	19.3	35.1		9.0	43	23.6	49.7		9.5	32	58.6	39.1		9.4		43.2	24.8	
9.2		2.9	28.1		7.3	53	36.5	48.1	A	9.0		31.2	46.8		9.5	33	58.7	0.5		7.0	12	16.3	36.3	A
9.1		18.6	33.8		9.5	54	25.5	50.5		8.1		39.9	13.8	B	9.3	34	27.8	2.6	B	9.5		58.0	28.1	
8.0		56.1	28.2	A	8.0		37.3	9.8	A	8.7	44	10.7	39.4		9.5	35	45.7	30.8		9.5	14	2.4	53.8	
9.5	15	17.0	54.9		8.8		45.6	38.1	B	9.5	45	12.3	41.4		9.5	36	22.0	30.8		9.4		19.2	37.1	
9.5		27.2	9.9		9.5	56	46.0	23.0		9.5		18.8	31.5		9.5	37	34.8	37.7		9.5	15	21.4	56.8	
9.5	18	20.8	30.5		9.5	57	2.5	6.8		7.3		39.0	0.2	A	9.1	38	21.0	51.1		8.8		24.6	52.7	
6.3	21	10.1	29.8	A	9.5		18.6	59.9		9.5		45.5	17.5		9.1		30.7	12.0		9.4	17	48.3	31.1	
9.5	23	9.0	39.6		9.5	58	54.0	40.6		9.0	46	45.6	50.7		9.4		31.5	24.3		9.0	19	3.1	51.4	A
7.8		30.0	57.0	A	9.4	59	10.3	45.0		7.4	47	33.7	11.1	A	9.3	39	50.3	28.1	B	9.4	20	57.7	24.1	
9.1		36.5	31.1		7.7		13.4	6.7	A	9.4		44.0	23.0		7.5	40	14.8	22.4	G	7.9	21	36.9	27.4	B
9.3	24	48.2	14.3		7.0	1	31.0	59.9	A	9.5	48	59.6	39.4		7.0		34.7	25.8	G	9.5	22	3.4	45.0	
9.3		54.1	7.0		9.5		32.8	3.3		8.9	49	34.9	57.9	A	7.7	41	23.8	8.6	G	9.5		8.1	51.9	
8.7	25	30.0	54.4	A	9.1		46.5	11.2		9.2	51	0.0	2.2	A	9.4		31.6	39.1		9.4		10.0	30.1	
9.3		38.5	41.0	B	8.0	2	15.0	26.9	A	9.4		6.2	59.3		9.5		32.2	18.0		9.2	24	3.5	5.1	
9.5	26	38.7	17.3		9.5	3	33.7	35.0		7.5		12.0	8.6	A	9.5	42	52.7	17.5		9.5		13.9	47.5	
8.8		52.7	40.5	B	9.5		58.8	11.0		8.8		19.3	14.7	A	9.2	43	18.3	28.6		8.0	28	28.9	18.0	B
9.2		52.8	13.2		9.5	4	15.5	40.2		8.6	52	31.9	57.8	A	8.8		55.1	25.0		9.0	30	31.9	16.0	
9.5	27	47.2	8.9		8.8	6	16.0	25.5	A	8.7	54	35.0	21.5		9.4	45	10.7	54.5		9.5	31	13.7	15.0	
8.3	29	57.8	27.2	A	9.3		30.9	11.1	B	9.5	55	49.1	28.2		9.5		38.8	12.5		9.5	32	38.4	34.3	
7.2	30	51.1	25.9	A	9.5	7	34.5	5.3		9.5	56	24.8	47.7		9.3	46	48.3	17.0		5.3		46.9	11.2	A
8.7	31	11.4	21.0	A	9.5		39.8	11.2		9.3	57	19.9	26.8		6.5	47	22.6	21.3	S	5.0		49.2	13.4	A
7.0		32.1	19.1	A	8.8		45.7	23.5	A	9.5		46.2	12.8		9.4		22.6	30.6		9.3	33	23.9	48.5	
9.5	32	36.5	46.6		9.0	8	16.6	10.3		9.5	0	27.2	12.3		9.5	48	24.0	4.9		9.4	35	12.5	36.5	
9.2	33	22.1	26.9		7.0	10	11.8	12.3	L	9.5	1	17.3	22.6		9.5		41.3	17.5		9.4		37.7	25.9	
5.8		55.1	38.8	A	8.7		15.5	20.7		9.3		44.5	48.6		9.5	49	0.0	2.1		9.5		56.5	20.7	
9.2	34	25.6	10.8		9.0		58.3	27.6		7.8	2	34.9	52.5	A	9.5		7.4	44.8	B	9.4	37	9.4	19.7	
7.6		35.0	51.3	A	9.3		59.7	20.0		7.3	3	1.1	18.2	B	9.5		17.8	48.8		9.5		30.1	3.4	
9.1		47.2	57.7	A	8.7	11	8.5	36.5		7.5		16.9	32.8	L	9.3		46.7	54.7		8.3	38	21.2	20.7	A
7.1		47.7	55.7	A	7.5		42.7	56.4	A	9.1		56.2	33.5		8.7		51.6	8.4	A	9.5		43.4	26.9	
9.3		55.5	29.2	B	9.5	12	48.3	19.1		9.5	4	7.7	19.5		9.4	50	15.4	31.2		9.0		58.3	54.3	A
7.1	35	4.6	30.5	L	8.9	14	27.2	3.9		7.1		19.4	48.6	A	9.5	51	3.1	29.8		8.4	39	13.6	8.3	A
9.5	36	8.7	19.7		9.1	17	26.5	3.9		9.2	5	14.0	52.0		9.5		8.2	0.6		8.9		20.4	51.8	A
9.5		18.5	40.1		9.5		41.8	15.3		8.9		18.2	0.0	A	9.5		36.8	28.1		9.5	40	37.0	28.3	
8.9		19.4	9.6	B	9.0	20	2.6	44.1		9.5	6	27.7	10.5		9.3	52	4.4	13.5		9.5		51.3	49.0	
9.5		31.0	25.3		9.1	21	24.7	2.9		8.5	8	3.2	31.8	A	9.5	53	20.9	40.2		9.5	42	3.4	39.1	
9.5	37	23.8	8.0		8.4		37.3	16.3		7.5		11.9	28.6	A	9.3		29.7	36.9		9.5		27.9	51.8	A
9.5		27.2	12.2		9.0	22	1.8	7.9	A	9.1	9	51.7	8.1	A	8.0	55	57.3	33.3	L	9.5		36.0	32.8	
9.1		31.5	53.4		9.5		16.4	26.1		8.8	15	39.4	16.5		9.2	56	3.5	11.0		8.5		40.5	3.9	A
9.2	40	21.3	34.1		7.8		29.4	56.6	A	9.2	16	16.3	40.1		6.0	58	25.0	19.0	G	9.0		42.2	0.7	B
9.5	41	33.2	4.5		8.7		42.7	15.3	A	8.2	17	23.3	35.1	B	8.2	59	38.2	37.3		9.3		49.3	7.7	
9.5	42	16.8	13.5		9.1	23	27.9	25.7	A	9.2	18	0.4	16.5		8.9		38.9	51.3		9.5	44	11.6	0.4	
8.8		37.6	3.7	A	9.5	24	43.5	15.2		9.5	19	43.5	17.0		8.8		51.9	48.5		7.0	46	2.9	9.6	A
8.5	43	9.6	57.9	A	9.1	27	14.5	7.9		9.5	21	10.5	10.5		9.5	0	15.5	10.6		9.0		5.9	41.5	
9.5		17.0	37.2		7.3	28	47.1	32.0	F	9.5		49.4	58.5		8.9		49.8	7.6		9.5	47	0.3	39.8	
9.0		34.3	22.6	A	9.3	30	46.3	5.2		9.4	22	13.7	0.6		9.2	1	11.3	36.6		9.5		38.1	46.8	

1901—1960				1961—2020				2021—2080				2081—2140				2141—2200			
	16ᵘ—17ᵘ	+53°			17ᵘ	+53°			18ᵘ	+53°			18ᵘ	+53°			18ᵘ—19ᵘ	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	48 54.1	15.2		9.5	31 28.0	14.5		9.5	0 17.9	57.5		9.5	22 16.8	34.0		9.5	46 2.3	16.4	
8.3	49 9.6	10.7	A	9.4	32 29.0	14.0		9.5	50.4	51.6		9.5	35.9	4.6		9.5	6.4	10.8	
9.5	50 7.6	59.0		9.0	34 26.4	15.2		9.5	1 24.9	59.7		9.0	48.6	22.6		9.4	15.5	25.9	
9.4	13.8	20.7	B	9.0	48.6	27.5		9.5	28.2	2.5		8.9	23 3.1	24.1		9.1	33.7	17.4	R
9.2	43.1	13.7		9.1	56.7	59.3		9.1	50.4	43.7	R	9.2	50.3	13.6		9.1	53.5	7.4	
9.0	51 13.8	12.7		9.1	35 3.6	10.2		8.1	2 1.1	21.0	B	9.2	24 1.1	33.0		9.3	47 37.3	3.5	
9.5	53 17.6	34.9		8.6	43.3	44.7	B	9.2	40.1	6.0		9.4	8.9	27.6		9.3	48 3.1	54.1	R
9.5	54 8.3	17.2		8.9	36 9.5	21.8	A	8.8	43.4	57.5		9.4	11.1	23.1		9.5	55.6	37.8	
9.0	16.5	13.7		9.5	22.8	36.7		9.0	47.9	55.1		7.0	38.4	51.0	A	9.0	49 0.9	27.4	
7.5	56 47.3	15.5	B	9.4	37 11.0	21.1		9.3	3 54.2	52.0		9.4	25 28.5	27.3		9.3	25.1	57.8	
8.9	57 59.2	36.3		9.5	11.5	31.4		9.0	58.4	40.7		9.5	46.9	10.4		8.9	50 19.3	24.4	
8.8	58 4.6	54.1	A	8.1	18.1	24.2	A	9.5	4 7.4	21.0		9.4	53.8	21.9		9.5	59.6	58.1	
8.9	48.2	22.7		9.0	43.9	24.0		7.8	19.1	10.2	A	9.1	58.1	55.8	A	9.5	52 46.9	39.8	
9.5	0 8.3	44.8		8.5	38 54.1	31.1	A	9.3	42.0	36.7		9.4	26 22.2	48.3		9.2	53 20.5	9.3	
7.8	43.4	24.4	A	9.3	39 10.9	49.4		9.2	5 15.5	4.0		9.3	23.5	51.1	B	9.5	24.2	50.5	R
8.2	1 7.6	0.9		9.3	50.8	26.8		9.0	57.6	12.2		9.3	37.4	8.1		9.3	47.2	54.4	
8.5	45.0	20.5	A	9.1	40 54.7	32.4		9.2	6 22.0	58.4		9.1	27 49.6	5.5	R	8.2	54 5.1	44.2	F
8.3	2 36.1	56.1		5.7	58.8	50.7	A	9.5	31.1	59.0		9.5	52.2	27.9		9.1	12.9	36.8	
9.3	45.8	22.8	B	9.4	41 20.0	4.2		9.3	36.4	28.3		9.5	28 44.6	56.2		9.5	23.0	34.8	
9.2	4 3.6	14.2		9.0	46.3	21.5		9.5	7 21.8	2.9		9.5	29 2.0	32.9		9.5	34.6	57.7	
9.5	5 23.1	49.7		9.0	42 42.3	29.1		8.8	38.2	15.3		9.5	5.9	41.0		9.3	55 7.3	18.9	A
9.5	6 11.8	16.1	B	8.4	43 5.5	32.4		7.8	42.9	28.2	R	9.5	31 23.6	43.8		9.5	58.2	15.9	
9.5	13.7	13.1		9.5	23.1	14.8		9.3	8 1.1	27.6	B	9.5	38.6	18.9		9.5	56 27.0	32.9	
9.5	8 59.4	37.6		7.5	26.4	37.7	A	9.0	29.7	26.8		9.5	44.5	20.4		9.5	43.1	32.1	
9.5	9 8.2	16.7		9.5	48.0	17.5		9.1	52.6	17.7		9.2	48.6	14.7		9.1	47.3	39.8	
9.2	11 26.9	59.7	B	9.0	44 13.5	40.6	B	9.4	53.5	9.0		9.3	33 12.3	12.6		9.1	57 25.4	6.4	
8.5	39.1	46.7	A	9.1	32.0	39.8		8.8	54.2	28.7		9.5	34 4.4	21.9		8.5	35.7	32.3	A
9.4	12 6.6	38.8		9.4	35.9	52.0		8.3	9 41.4	31.6	R	8.2	17.8	3.4		8.9	49.0	5.1	
9.0	18.9	48.5	B	9.4	36.2	41.4		9.3	57.1	31.3		8.5	35 15.0	45.0	A	8.8	58 4.4	15.0	
9.4	26.3	49.9		9.4	40.2	38.3		8.8	10 4.7	39.5	B	9.3	18.2	54.5		8.4	8.2	55.1	A
8.6	13 44.0	32.7	A	8.7	45 10.9	36.1	A	9.5	5.6	12.8		9.5	36 39.3	0.5		9.5	34.9	8.5	
8.8	15 9.6	47.2	A	9.5	32.8	15.0		9.5	39.4	6.2		9.4	44.6	38.8		9.5	51.6	37.8	
9.3	21.0	13.0	B	9.3	52.3	37.1		9.0	42.9	28.7		8.3	45.9	10.9	A	9.1	59 26.3	29.8	
8.8	23.1	54.6		9.4	46 11.5	3.4		8.3	44.2	38.1	R	9.4	37 21.0	1.0		9.5	34.5	3.5	
8.6	29.6	38.4	A	9.5	47 10.0	4.2		9.5	11 4.7	37.7		9.1	26.9	54.1	A	8.6	52.9	33.3	A
9.3	16 20.0	15.7		9.5	48 10.3	43.4		9.5	40.9	39.7		9.2	33.6	29.5		9.3	1 35.4	35.9	
6.0	18 37.3	33.6	B	9.5	49 8.8	10.5		8.8	41.6	36.6	R	9.1	46.8	52.4	A	9.1	38.3	6.5	B
8.9	58.7	59.0	R	8.8	51.9	27.5		9.5	12 6.9	7.5		9.4	38 20.0	45.8		5.4	39.7	11.7	A
9.5	19 1.3	52.5	B	8.8	59.8	17.8		9.2	52.6	50.7		9.0	22.6	40.8	A	8.9	40.7	7.8	
9.5	28.4	5.1		9.0	51 15.4	59.0		7.3	56.2	13.8	G	9.2	49.6	16.4	R	9.3	2 21.3	15.4	
8.1	20 29.7	28.2	P	9.1	18.9	48.4		9.5	13 44.8	5.5		9.4	54.8	5.4		8.8	41.7	5.0	A
9.5	30.4	12.0		9.3	21.0	18.1		9.5	14 19.9	55.0		8.3	39 9.9	0.5		8.8	3 0.3	33.8	R
9.5	21 4.4	38.4		9.3	44.8	56.3		9.5	20.5	4.1		8.8	32.7	35.8	A	8.8	10.7	35.6	R
9.5	54.6	19.2		8.9	52 10.4	45.7		8.0	36.4	41.6	A	9.3	56.5	29.4		9.5	23.5	9.1	
7.5	59.7	15.3	A	9.5	14.9	18.0		8.6	15 9.6	32.7	A	8.3	40 9.3	17.0	A	9.0	57.2	37.2	B
9.5	24 25.5	29.9		9.5	18.8	36.2		9.4	16 31.0	10.6		6.0	24.3	43.8	A	9.1	4 32.3	25.4	A
9.3	25 38.1	20.8	B	9.5	53 56.6	51.8		9.4	41.7	13.8		8.8	54.0	7.8	A	8.5	5 3.7	51.8	A
9.5	40.8	24.6		8.0	56.9	27.8		9.5	45.2	17.6		9.5	41 18.5	27.9		7.5	7.9	24.4	A
9.5	48.0	17.2		9.2	55 55.6	9.6		9.5	17 34.0	25.6		9.3	21.3	18.4		9.2	21.6	34.3	A
9.4	26 32.0	4.0		9.1	56 41.9	4.4		8.9	44.3	25.7		9.2	42 48.6	46.2		9.0	26.8	58.0	
9.5	44.8	29.1		8.9	51.8	16.3		9.5	58.5	31.7		9.5	43 11.0	51.5		9.2	6 9.3	35.3	A
9.4	47.8	1.8	B	8.7	57 11.0	53.9	B	8.0	18 9.3	20.3	B	9.5	24.3	52.0		9.5	15.0	3.0	
9.0	55.1	11.2		7.8	47.4	37.9	B	8.2	20.1	56.7	A	9.0	39.7	30.6	A	9.4	25.9	54.4	
8.9	27 2.3	11.0		8.5	51.9	20.7		9.4	59.0	31.5		9.2	46.1	50.8		9.5	27.1	9.0	
8.8	16.5	15.0		9.5	58 43.7	47.1		9.5	19 22.2	40.6		9.0	44 0.9	46.5	A	9.2	43.7	29.7	B
9.5	39.6	0.8		9.2	54.8	37.1		9.5	47.2	37.5		8.5	4.3	40.8	A	9.4	7 29.6	31.8	A
9.5	46.6	40.9		9.3	59 34.2	5.2		9.3	57.9	22.2		8.3	25.0	15.0		9.2	32.4	6.5	
9.5	28 5.0	31.4		9.4	34.9	11.1		9.2	20 17.8	42.9	R	8.4	30.2	2.8	R	9.5	42.5	19.6	
9.5	12.3	3.1		9.5	37.0	57.5		6.5	41.7	13.7		9.3	39.2	50.7	B	9.0	47.7	24.	
9.5	31 1.0	39.1		9.5	48.4	14.4		9.1	54.2	45.0	R	9.3	45 55.1	36.8		9.4	8 9.8	5[illegible]	

2201—2260				2261—2320				2321—2380				2381—2440				2441—2500			
	19ᵘ	+53°			19ᵘ	+53°			19ᵘ—20ᵘ	+53°			20ᵘ	+53°			20ᵘ	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	9 9.9	42.8	A	9.5	29 26.6	43.8		9.1	51 33.3	11.3		9.4	14 18.3	11.3		8.0	31 58.0	57.5	A
9.5	35.6	13.9		9.4	37.0	34.5		9.3	46.8	47.8		9.3	36.3	0.3		9.3	32 9.8	24.7	
9.0	36.0	3.6		9.3	38.0	5.6		8.1	55.1	59.7	A	9.4	15 39.6	7.8		9.0	19.0	12.2	
9.0	41.7	37.6	A	9.4	43.5	34.5		9.5	52 11.6	9.1		6.5	16 40.3	7.7	A	9.5	33 25.7	4.4	
9.4	10 8.2	43.4	A	8.9	30 21.5	9.0		9.5	28.2	55.8	B	9.2	42.8	2.0		9.2	27.5	1.8	
9.2	13.9	46.7	A	9.1	31 0.7	48.3		8.2	28.7	59.8	A	9.4	47.8	57.4	A	9.0	30.1	59.7	A
9.5	31.0	51.7		8.6	44.6	53.0		9.4	34.0	1.4		9.2	51.8	18.0		8.4	38.5	20.7	B
9.4	11 35.6	26.4		9.3	46.4	6.4		8.0	56.7	23.9	A	9.4	17 17.7	49.2		8.2	41.6	13.0	B
9.4	41.8	2.5		7.0	32 5.4	13.9	A	9.2	53 14.9	9.3		9.5	53.8	33.9		9.2	58.2	59.3	A
9.4	51.9	2.5		8.5	43.3	3.0	A	8.9	32.5	4.0		9.5	59.2	44.4		9.5	34 29.2	54.8	
8.7	55.8	52.5	A	9.4	33 6.5	40.9		9.5	54 15.2	59.9		9.1	18 11.9	11.2		9.1	35 7.7	44.4	
9.5	12 3.0	57.0		9.5	13.5	45.8		8.5	29.2	31.8	A	9.0	28.6	10.2	B	9.0	20.0	18.3	
9.5	10.5	56.2		9.4	31.2	37.3		9.5	55 18.8	21.5		9.3	19 11.2	41.8		9.1	27.8	42.4	
9.5	18.9	26.4		9.3	49.7	15.0		9.5	29.6	34.8		8.5	20 6.4	52.1	A	9.5	31.7	48.0	
9.0	13 4.3	18.7	A	9.5	54.6	1.9		8.7	32.4	10.6	A	9.5	16.0	30.1		9.5	32.1	55.2	B
4.5	47.0	6.1	A	9.5	34 14.6	15.4		9.0	44.2	57.1		9.0	31.2	34.0		8.6	36.3	47.0	A
9.1	52.5	56.0		9.5	52.5	57.2		9.0	57 14.7	48.8		6.2	37.9	4.9	B	9.5	42.0	17.1	
8.6	14 23.6	52.4		9.5	35 17.1	1.8		9.5	16.7	10.1		9.4	49.7	35.3		8.8	36 13.2	45.4	A
8.1	58.0	12.3	A	9.5	18.9	4.3		8.1	22.9	6.7	G	9.2	21 18.0	57.3	A	9.0	15.3	56.4	A
7.9	15 2.8	8.1	A	9.5	23.6	10.5		9.0	58 5.7	37.3		9.5	32.1	3.2		9.4	15.8	13.8	
9.0	5.9	58.9		9.2	29.9	28.4	B	9.5	14.2	51.3		9.2	39.5	37.7		9.5	19.1	55.9	
9.5	18.2	7.6		7.7	42.8	50.9	B	9.5	15.7	47.3		9.5	22 9.0	58.6		9.5	28.3	3.6	
7.8	20.7	42.2	B	9.0	46.8	16.0	A	8.3	59 6.0	28.9		9.1	23.1	41.0		9.5	52.5	55.6	
8.7	28.4	3.0	A	8.6	48.2	18.5	A	8.0	0 4.7	1.9	L	8.5	23.1	32.3	A	9.5	56.9	14.7	
8.5	42.2	23.7	A	9.4	36 14.6	9.1	A	9.4	20.2	25.5		8.2	26.5	18.6	A	9.4	37 6.7	4.8	
9.4	16 15.9	52.9		9.5	24.0	6.2		9.3	33.4	59.9		8.5	29.6	33.0	A	7.8	24.4	41.3	A
8.1	34.2	5.4	A	9.5	40.3	48.5		8.5	36.8	41.8		9.5	43.2	4.4		9.0	36.6	17.6	
8.5	47.3	16.5	A	9.0	40.9	20.5	A	9.3	1 15.6	49.6		9.5	23 8.1	20.3		9.5	41.5	32.9	
8.8	18 37.2	36.6	A	9.0	43.7	38.4		9.4	22.3	9.4		9.5	12.7	48.1		9.0	43.4	11.1	
9.5	48.6	31.2		9.2	47.7	34.9		9.5	41.2	50.2		9.0	17.9	21.8	A	8.8	46.7	30.3	
9.4	19 5.4	1.0		9.0	37 0.5	59.2		9.0	48.6	2.2		9.3	40.2	5.9		7.6	54.5	54.0	A
9.1	25.2	19.9	A	9.4	58.9	58.6		9.5	2 27.4	38.8		9.3	44.0	32.1		8.8	38 15.7	3.3	A
9.2	33.7	29.7	A	9.5	38 13.7	47.8		8.6	33.2	31.4		9.3	46.3	3.0		9.3	23.4	54.8	
9.5	58.5	58.4		9.5	27.2	28.0		9.5	47.7	28.9		9.5	24 1.7	13.9		9.3	24.0	50.6	
9.0	20 42.6	29.7	A	9.4	39 22.6	2.0		9.5	51.7	26.5		9.5	3.7	20.5		8.7	33.1	33.5	
9.3	21 0.1	4.0		9.0	26.8	58.2		9.5	3 31.0	6.6		9.5	56.5	58.7		9.5	57.4	57.4	
9.5	2.2	30.2		8.5	40 46.5	39.8		9.5	38.4	8.7		9.5	25 17.3	49.6		9.5	40 20.0	44.4	
8.5	53.9	29.2	A	9.5	47.1	8.6		9.5	4 15.0	15.5		8.5	19.3	3.9	A	9.5	24.4	50.5	
9.4	54.4	9.1	B	9.2	41 32.0	19.0		9.0	15.4	34.1	B	7.7	45.1	38.4	A	9.1	26.0	34.1	
9.5	22 3.2	12.4		9.5	42 45.1	37.4		9.5	6 59.1	3.3		9.5	52.1	37.5		9.5	35.2	36.8	
9.1	47.1	51.3		9.3	43 47.6	36.3		8.6	7 32.5	47.3		7.3	57.8	13.2	A	8.6	44.6	58.7	A
9.2	23 12.7	23.7		8.9	44 14.1	33.6	B	9.5	8 28.0	44.9		9.5	26 10.8	37.6		9.0	50.5	5.1	A
9.2	28.4	30.6		7.1	45 32.5	24.2	B	8.0	42.7	28.2	B	9.5	12.7	1.0		9.5	56.1	44.6	
9.4	30.6	25.9		9.4	46 17.6	45.8		9.3	51.3	58.6	A	9.4	14.1	36.6	B	9.2	41 12.9	27.4	A
9.4	56.0	2.3		8.9	34.7	56.0		9.4	9 1.2	54.6	A	9.5	23.9	59.0		7.9	23.6	29.3	A
9.5	24 53.0	48.8		9.0	42.8	46.9		9.4	9.0	36.3		9.5	41.1	45.2		7.9	42 1.5	51.7	A
7.8	25 3.4	40.3	A	9.4	47 3.7	29.9		9.0	31.4	5.0		9.5	47.5	36.8		9.5	7.0	7.6	
9.4	16.2	12.0		7.7	8.2	32.4	F	6.6	50.7	13.3	B	9.4	50.4	15.9		9.4	17.2	2.9	
9.5	23.6	55.5		9.0	25.5	26.5		9.4	10 1.7	56.6		9.3	27 32.1	44.6	A	9.3	51.2	5.0	
9.3	26 35.8	45.0		9.0	54.5	9.0		9.5	10.0	38.9		8.2	49.3	37.9	A	9.5	43 17.2	35.0	
8.1	37.9	40.8	A	9.2	48 5.7	17.0		9.5	40.5	13.5		9.5	28 12.0	22.5		9.5	36.6	54.8	
9.4	40.7	47.9		9.0	15.2	24.5		9.5	48.7	23.0		9.5	21.5	20.3		9.0	44.5	13.4	
9.4	45.5	40.4		9.2	50 0.2	56.7		9.4	11 27.3	8.7		7.0	23.0	39.7	A	9.0	44 0.8	26.6	B
8.5	27 38.2	44.9		9.4	3.5	23.0		7.0	31.6	42.8	A	9.5	48.8	12.8		9.1	5.0	44.4	
9.0	28 12.8	52.6		9.5	3.7	18.5		9.4	34.1	53.0		6.8	29 13.5	57.3	A	7.5	24.0	22.2	B
9.0	43.5	54.8		9.5	27.3	5.6		9.3	12 8.8	39.0	A	9.4	17.9	37.6	A	8.8	32.1	32.9	
9.4	50.8	22.5		9.5	35.3	4.5		9.4	13 16.2	3.3		9.5	31.8	45.5		6.6	45 1.7	41.8	A
9.0	59.7	57.2		8.0	40.5	55.2	A	8.6	14 2.6	3.4	A	8.8	30 49.9	19.5		9.1	3.2	4.2	
9.0	29 11.4	47.2		9.5	50.0	55.7		6.5	7.3	51.8	A	9.3	31 23.5	41.0		8.6	3.4	49.9	A
9.0	23.2	31.0	B	9.2	51 32.8	18.5		8.6	9.0	34.1	A	8.5	48.5	50.6	A	9.2	9.6	3.1	

2501—2560				2561—2620				2621—2680				2681—2740				2741—2800			
	20h—21h	+53°			21h	+53°			21h	+53°			21h	+53°			21h—22h	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.3	45 10.3	59.1		8.9	4 44.7	2.2	A	9.5	20 50.8	44.9		9.2	35 25.7	1.7		9.1	50 13.8	12.8	A
9.3	46 23.9	26.8		9.0	47.9	46.0	A	8.9	52.4	40.1		9.5	27.6	37.0		8.9	51 24.2	55.8	A
9.2	32.0	34.7		8.1	5 25.6	9.8	A	9.2	54.8	36.4		8.9	32.0	22.4		9.5	25.1	26.5	
9.5	36.8	55.1		9.3	6 34.1	17.0		8.5	56.8	52.1	A	8.6	45.8	40.0		9.5	29.9	34.0	
8.0	47 16.9	32.3	A	9.5	45.8	59.2		9.5	21 32.6	55.4		9.5	36 34.5	32.8		9.5	43.7	41.4	
8.2	18.8	29.9	A	8.1	54.1	31.3	B	9.4	22 6.4	16.8		9.3	37 12.1	27.7		9.4	52 17.9	54.7	
9.5	33.2	2.1		7.5	57.4	50.5	A	9.2	7.5	0.5		8.8	16.4	24.5		9.5	39.8	58.6	
9.5	34.9	24.6		6.5	7 11.1	9.7	A	9.2	34.4	51.5		9.5	39.8	49.6		9.1	53 15.4	52.3	
9.5	48 2.3	45.2		8.9	37.8	46.7		9.5	51.3	7.4		7.6	56.7	6.4	A	8.8	21.3	47.2	
9.3	12.6	21.2		7.0	47.8	14.2	A	9.3	23 15.2	53.3		6.8	38 3.6	54.3	A	9.4	25.3	51.3	
6.5	49 10.7	58.1	A	8.0	8 0.2	18.3	A	9.3	36.4	27.3		9.5	33.2	48.1		9.5	28.9	21.3	
9.5	20.1	0.5		8.3	4.1	52.3	B	9.5	39.8	12.8		9.5	39 4.7	55.8		8.5	34.2	32.9	A
9.1	44.0	9.8		9.4	9 9.2	24.7	B	8.1	24 22.1	9.5		9.2	8.0	2.9		9.5	52.9	49.8	
7.1	50 7.6	12.9	B	9.5	10.8	23.0		9.5	31.7	41.5		8.2	8.1	37.5	A	9.5	54 20.5	55.2	
9.0	25.3	3.1		9.5	18.3	31.2		9.3	25 7.2	7.0		9.5	27.4	24.2		9.4	21.2	50.2	B
8.6	46.6	10.8	B	9.3	38.2	24.0		9.5	20.3	21.3		9.0	40 3.7	47.0	A	9.5	22.5	55.7	
9.0	50.4	57.1		8.6	45.7	43.1	A	9.0	40.8	36.9		8.6	17.4	50.7	A	9.2	30.0	29.2	A
9.0	51 0.6	31.9		7.5	47.8	52.9	A	9.4	46.0	18.6		9.5	39.9	5.2		8.8	44.6	22.7	A
9.5	18.4	38.6		9.0	10 38.0	7.8		8.8	26 24.8	16.7	A	9.2	52.3	1.7		7.5	51.5	24.8	B
8.0	27.2	15.4	A	9.2	40.4	15.2		9.2	27 0.9	13.8		9.3	58.0	2.6		9.2	52.1	36.4	
9.0	52 11.9	23.1		9.2	40.9	22.9		9.5	6.1	58.9		9.4	58.2	4.2		9.2	57.0	25.7	
9.5	20.8	52.5		9.0	11 14.8	20.0		7.5	19.0	22.5	A	9.4	41 12.9	51.6	A	9.3	55 17.2	43.7	
8.8	28.0	15.2		9.5	29.7	15.3		9.2	43.8	7.6	A	9.4	28.7	26.9	B	9.5	21.5	27.0	
9.3	44.5	28.6		9.1	48.9	13.7		8.7	49.8	9.7	A	9.5	31.5	30.9		9.0	24.0	28.3	S
8.5	48.1	3.1	A	9.5	12 1.6	2.0		9.1	28 10.5	9.6		9.4	42 35.6	57.1	A	9.3	24.0	13.0	
9.5	53 45.9	22.0		9.1	15.2	12.4	A	8.5	19.4	28.3		9.5	45.1	39.7		9.0	44.7	27.6	A
8.5	54.5	25.6		9.2	23.7	4.4		7.4	29 2.3	40.5	A	8.8	43 14.2	26.5		8.4	56 19.1	17.0	A
9.2	55.4	30.9		5.8	29.9	23.4	A	9.2	3.6	35.7		8.0	17.8	42.9	A	7.9	23.8	5.7	A
9.5	54 16.2	35.0		8.1	46.1	46.5		9.4	20.9	15.9	B	9.1	44 24.1	54.1	A	9.5	56.0	33.0	
9.5	55.4	59.9		9.5	13 12.7	7.7		9.5	30 20.4	21.6		8.6	24.2	50.6	A	9.4	57 50.4	49.5	
9.5	55 29.8	46.8		9.5	26.4	22.6		8.0	42.7	1.8	A	8.0	25.7	9.1	A	9.5	54.0	21.1	
9.4	56 0.8	19.1		9.5	39.5	29.5		9.3	31 4.7	16.7		8.0	27.5	42.0	A	9.5	55.0	47.4	
8.7	20.0	58.0		7.4	56.4	34.0	A	9.5	43.2	2.8		8.3	31.0	31.1	A	9.5	58 1.9	55.4	
9.5	57 5.5	20.1		8.6	14 4.7	59.1	A	9.5	47.0	4.2		9.1	33.8	41.7	A	9.5	10.0	36.4	
9.0	21.3	47.3		9.5	16.0	24.0		7.5	32 12.3	59.5	A	9.5	38.7	1.8		9.4	14.8	43.7	
9.5	59.2	12.1		9.5	20.7	32.9		9.4	20.8	6.6	B	8.0	56.6	33.8	A	9.4	44.3	41.8	
9.5	58 18.5	24.1		9.5	39.8	58.4		9.5	42.7	0.4		9.5	45 5.1	0.3		8.5	59 28.2	13.8	
9.0	43.6	57.1		9.5	43.8	22.2		9.5	47.4	15.2		9.4	19.8	17.0		8.5	32.0	3.1	A
8.7	59 12.9	45.1	A	7.6	15 10.3	20.6	A	6.5	50.0	23.8	G	8.6	46 22.0	36.5	A	9.5	37.6	59.6	
8.0	18.5	23.1	A	9.2	12.8	42.8	B	9.5	50.0	17.6		9.4	40.7	0.9		9.0	47.9	58.4	
8.3	23.9	23.0	A	9.5	23.9	34.7		9.4	33 9.8	14.5		9.5	44.7	57.3		8.9	0 7.0	39.7	
7.1	28.3	45.9	A	9.4	24.6	59.7		9.3	12.7	58.3		9.5	53.0	46.4		9.0	14.5	40.3	
9.5	48.8	12.5		9.3	27.0	59.0		9.4	13.0	46.9		9.1	55.8	20.0	A	9.5	55.8	16.1	
9.5	54.9	4.2		9.5	40.9	17.2	A	9.4	17.2	2.1		8.7	47 12.6	48.0	A	9.5	1 6.9	52.5	
8.8	0 51.8	39.9	A	7.8	41.5	34.3	A	9.3	17.3	11.3		9.0	20.8	1.9	A	9.5	15.2	4.2	
8.0	1 7.2	5.4	B	9.0	16 44.1	50.2	A	9.5	19.8	8.1		9.5	45.4	12.6		9.0	21.3	48.6	A
8.5	37.0	49.7	A	8.3	44.3	59.2	A	9.3	20.0	17.3		6.5	48 15.8	18.7	A	9.4	45.7	51.5	
8.5	37.9	52.1	A	9.4	17 53.2	5.1		9.5	40.0	16.2		9.1	28.8	36.6	A	9.0	47.0	27.4	
8.6	40.0	47.0	A	7.2	18 7.0	36.7	A	8.8	40.5	4.6		9.4	36.0	10.2	A	9.4	53.8	58.0	
9.4	46.4	30.7		8.6	7.7	40.5	A	9.5	34 2.5	11.9		9.4	38.0	7.3	B	9.3	2 39.5	48.9	
8.3	55.8	26.5	A	9.2	16.8	5.2		8.0	11.8	7.5	L	9.1	50.5	9.8	A	9.0	50.3	58.3	
7.4	2 13.5	38.2	A	9.4	29.4	24.3		9.2	18.3	46.9		8.9	51.7	36.9	A	9.5	3 2.4	48.5	
9.0	13.9	42.0		9.5	31.9	22.9		8.4	19.3	1.5		9.2	49 47.8	27.9	A	8.8	16.3	34.4	
7.8	21.0	22.5	A	9.5	19 9.0	18.2		9.0	19.4	29.8		9.0	51.4	54.0	A	9.5	41.0	31.4	
9.3	34.2	2.1		8.5	27.9	12.2	A	9.5	29.0	8.9		7.2	51.9	14.8	A	9.5	4 0.0	54.0	
9.3	3 14.7	1.0		8.7	54.8	27.1	A	9.5	39.5	14.9		9.0	56.4	49.0	A	9.0	1.9	27.	
9.3	35.4	1.4	B	9.5	58.5	49.2		8.8	40.3	58.5		8.4	57.8	1.8	A	9.5	4.3	57.	
9.2	37.6	51.5		8.9	20 1.7	0.4	A	9.5	53.9	24.3		9.4	50 2.4	21.4		8.3	8.8	26	
8.7	59.6	4.0	A	9.5	7.5	6.5		9.5	35 1.7	4.0		9.4	3.9	18.5		9.3	15.4	36	
8.5	4 5.5	11.9	A	9.3	39.8	35.5		7.6	9.0	18.8	B	8.0	5.6	29.1	A	7.7	52.3	5	

2801—2860				2861—2920				2921—2980				2981—3040				3041—3100			
	22h	+53°			22h	+53°			22h	+53°			22h	+53°			22h—23h	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	4 58.8	20.3		9.5	17 23.3	5.5		9.5	29 9.5	10.7		9.5	40 40.0	12.6		9.5	52 52.0	14.7	
9.3	5 29.9	59.7	R	9.5	32.2	5.7		8.9	32.1	35.9	A	9.4	45.1	40.6		8.4	54.3	44.7	B
9.4	37.7	8.2		9.1	41.5	56.5		9.0	49.7	47.2	A	8.3	48.5	4.7		9.3	53 0.6	57.8	
8.9	50.5	3.6		9.2	41.9	52.6		8.4	52.2	27.4	A	8.1	53.0	2.2	L	9.3	2.3	39.6	
9.2	6 2.4	37.5		8.5	50.6	35.1		9.5	59.0	37.0		8.6	54.5	11.3	B	9.5	5.7	29.3	
9.5	18.0	42.1		8.7	18 0.4	5.6		9.5	30 15.5	49.1		9.2	55.3	59.6		9.5	13.4	32.4	
9.3	39.3	12.2		9.2	2.3	47.3		9.5	18.3	9.3		7.6	41 13.4	59.3	G	9.4	19.6	42.5	
9.0	55.1	9.5		8.9	19 4.8	58.3		9.5	18.5	56.9		9.5	27.5	4.0		9.1	54 1.3	51.4	
8.8	55.8	42.2	A	8.0	11.9	39.6	B	9.5	30.8	34.2		9.5	28.3	11.5		9.5	6.7	55.9	
8.6	7 2.4	24.5	A	8.4	17.6	59.2	B	9.5	34.4	25.0		9.1	55.4	20.8		9.5	14.2	36.3	
9.0	22.9	22.8	B	9.4	58.5	47.6		8.5	44.3	2.2	A	9.0	42 15.3	15.9		9.0	35.1	13.4	
9.5	26.4	13.3		9.5	20 2.8	7.6		7.3	59.8	40.1	A	8.6	25.1	23.3		7.7	36.7	32.5	B
8.5	34.7	16.0	A	9.0	7.2	20.8		9.4	31 18.6	29.8	B	6.0	47.4	39.2	G	9.5	49.1	52.2	
9.0	38.8	46.8	A	7.1	8.5	4.8	G	9.3	27.5	34.1	A	9.5	50.3	20.3		9.5	55 15.0	12.1	
9.0	45.1	10.7	A	9.4	10.3	6.3		9.4	32.7	10.2	B	9.4	56.5	51.3		8.5	20.0	51.7	
9.4	52.2	7.1		7.1	14.4	12.0	G	9.5	33.1	33.4		9.5	43 9.4	3.8		9.0	30.9	58.7	
9.1	55.5	11.1	A	8.1	19.0	2.5	G	9.1	34.3	12.3	A	9.2	12.3	28.5		9.1	33.8	20.4	
9.3	56.0	28.7		9.4	35.4	53.1		9.4	34.5	4.8		9.3	35.7	5.8	B	9.0	49.4	18.5	
9.3	8 5.8	49.6	A	8.6	38.0	5.1	G	9.0	45.9	11.5	A	8.4	42.4	54.4		7.4	56 1.5	1.7	G
9.5	27.3	41.4		9.5	39.2	41.5		9.5	32 4.1	32.2		8.1	46.8	16.4	B	9.4	4.5	4.3	
9.2	49.7	49.5	A	9.4	40.8	13.9		9.5	17.1	3.9		8.0	44 6.1	9.7	B	8.9	18.0	23.9	
9.3	51.7	5.4		7.6	48.5	21.8	G	9.4	25.5	57.4	B	9.4	11.6	44.8		8.3	27.6	41.3	
9.2	55.0	0.1	A	8.9	55.9	54.0	A	9.5	44.9	32.3		9.5	15.3	17.1		9.1	35.9	12.4	
8.8	9 31.4	45.9	A	8.5	21 8.8	46.0	A	9.5	33 44.0	42.5		9.5	26.5	8.4		9.4	57 8.8	12.2	
9.2	36.3	47.6	A	9.5	27.5	26.6		8.9	52.6	55.6	B	9.3	36.6	7.7		9.3	26.0	10.0	
9.5	44.2	45.7		9.4	29.0	40.4		9.5	55.6	43.6	B	8.8	37.5	0.1		8.2	39.7	25.1	B
9.4	55.1	34.8	B	9.0	32.3	44.8	A	9.5	34 5.3	9.5		9.5	43.8	37.6		8.3	58 16.0	14.5	A
9.3	10 4.4	5.5	A	9.3	36.9	56.2	B	9.5	9.1	35.0		8.9	58.3	22.5		9.5	38.8	37.3	
9.0	11.6	38.1	R	9.4	53.2	52.4		9.3	16.3	50.9		8.5	45 6.2	8.8		9.1	54.6	8.8	
8.4	21.4	48.7	A	9.5	22 27.3	46.9		6.0	25.5	5.5	G	9.0	13.3	32.5		9.5	59 2.1	48.6	
7.8	27.1	56.9	A	9.5	42.2	53.8		9.1	33.0	35.4		8.4	37.5	0.7	A	8.9	29.0	13.9	A
8.9	47.7	13.3	A	9.5	52.8	25.4		9.0	50.0	10.0		9.2	56.7	15.1		9.5	36.5	1.5	
9.5	48.0	27.0		9.5	23 10.7	45.0		9.1	35 7.1	51.5		8.7	59.4	40.1	A	9.5	50.9	57.0	
9.0	49.5	18.6		9.5	17.9	30.6		9.3	11.8	13.4		9.2	59.4	10.6		9.5	0 30.6	28.6	
9.5	11 5.2	41.7		9.4	20.1	23.6		9.5	12.5	31.6		9.5	46 26.1	54.8		9.4	33.9	41.2	
9.5	33.8	28.1		9.4	24.9	12.7		9.2	26.3	41.7		9.5	47 3.5	3.8		9.0	39.5	57.6	A
9.4	39.0	28.8		6.5	41.8	30.1	G	8.8	29.8	19.5	A	9.3	14.9	11.2	B	9.5	42.8	4.4	
8.5	40.4	47.1	A	8.7	46.7	21.2		8.0	41.4	37.6	A	9.5	19.8	14.0	B	9.0	1 36.3	32.5	
9.5	58.0	51.2		9.5	24 8.0	4.0		9.4	36 7.4	1.1		9.4	22.4	7.7		9.5	36.3	42.7	
9.5	12 7.9	22.8		9.0	9.4	2.6		6.0	25.9	8.8	A	9.4	24.5	52.7		9.5	41.9	21.7	
8.2	55.1	46.1	A	9.5	21.5	20.0		7.3	29.4	29.4	A	9.5	29.0	1.0		9.5	2 6.9	53.8	
8.9	13 8.9	51.3	A	8.8	34.1	39.7	A	9.4	47.2	15.0	B	9.3	29.0	15.2		9.5	43.5	12.0	
9.3	16.8	32.5		9.2	56.1	43.9		7.4	59.3	59.7	G	9.5	48 2.2	42.5		9.2	57.6	43.4	A
8.0	23.7	51.4	A	8.7	25 1.0	32.9	A	9.4	37 27.8	18.8		9.4	13.0	14.1		8.5	3 2.8	38.4	A
9.2	34.4	5.0		9.5	13.4	32.8		9.5	44.4	33.9		9.5	24.7	23.8		8.1	5.1	49.1	A
9.5	14 4.7	4.0		9.5	17.6	31.0		9.2	50.4	58.9		9.4	49.5	2.4		9.1	4 13.2	18.2	
9.5	18.2	49.1		9.4	35.8	27.7		9.5	38 1.6	22.9		9.5	49 3.3	52.0		9.2	43.0	31.1	
9.5	59.1	53.2		9.5	26 2.8	56.1		9.4	18.5	48.4		9.5	6.0	19.6		9.5	5 9.1	58.0	
8.3	15 2.4	4.9	G	9.5	24.0	7.3		9.0	37.9	30.3	B	9.5	7.5	1.8		9.5	9.4	26.3	
9.4	11.5	4.9		6.5	34.3	16.8	A	9.4	50.8	54.3		9.5	31.4	16.2		9.2	23.8	38.4	
8.7	15.5	3.4		9.5	48.5	2.5		9.0	50.8	19.9		9.4	43.5	5.7		9.1	35.4	50.0	
8.5	27.3	42.3		9.5	50.3	51.7		9.5	39 12.5	6.6		8.0	45.8	28.7	A	8.9	38.2	53.1	
9.1	34.8	44.0		9.5	27 12.2	58.8		8.4	23.4	57.4	A	9.1	58.2	27.4	B	8.4	44.3	45.0	
9.1	36.1	43.9		9.0	16.1	24.3		9.0	35.3	55.1		9.4	50 0.7	26.6		9.4	57.4	4.0	
8.8	36.8	59.3		9.1	39.7	24.6	B	8.5	40.2	34.9	A	9.5	32.9	58.5		9.1	6 9.8	39.0	
8.5	41.4	48.8		9.5	28 8.3	17.0		9.3	43.0	0.4		9.1	49.9	43.5		9.1	11.7	6.9	
9.4	51.9	9.8	R	9.5	14.5	6.6		9.5	40 12.3	19.1		9.2	51 1.5	8.7		9.3	21.1	32.7	
8.5	16 24.1	24.6		7.3	24.2	19.9	A	9.5	12.9	13.8		8.5	16.6	17.1	A	9.5	21.4	23.3	
9.5	44.5	1.7		9.5	36.3	59.9		9.5	13.4	15.6		8.3	44.1	52.1		9.5	7 12.8	0.1	
9.5	17 17.4	28.5		9.0	54.1	43.3	A	9.1	16.5	0.4		9.5	52 27.4	28.8		9.1	27.8	56.9	

3101—3139				3140—3178				3179—3217				3218—3255				3256—3293			
	23u	+53°			23u	+53°			23u	+53°			23u	+53°			23u	+53°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	7 33.4	9.8		9.2	14 11.5	55.9		9.2	24 59.0	24.8		8.6	34 53.4	53.5	A	8.2	49 15.7	9.5	L
9.5	35.5	43.2		9.2	11.6	36.8		8.7	59.4	22.8	B	8.3	35 26.3	48.0		9.2	17.3	48.8	
8.1	37.3	0.0	B	9.4	15.3	41.0		9.1	25 4.8	37.4		9.5	33.9	5.2		9.4	25.0	16.2	
9.5	47.0	56.0		9.4	21.5	8.3		8.5	6.8	13.2		9.3	36 10.5	18.4		9.5	50 19.1	46.2	
9.3	57.0	47.2	B	9.4	31.0	53.2		8.9	8.4	52.5		9.5	28.1	12.4		9.5	30.8	49.0	
9.3	8 10.6	41.4		9.5	42.6	6.2		9.5	30.6	5.0		9.2	37 13.5	41.0		9.4	34.7	45.2	
8.5	15.3	8.7		9.5	15 25.9	52.3		9.0	42.5	16.0		9.5	32.7	29.3		9.1	41.3	10.1	
9.3	40.2	39.3		9.0	30.4	32.1		9.4	44.9	57.4		9.5	38 3.5	59.9		9.2	51 2.5	29.4	
8.5	44.1	34.3		8.5	47.1	18.9	G	9.5	49.6	34.1		9.5	6.7	1.0		9.3	4.7	20.0	
9.4	9 1.1	14.8		7.9	16 3.4	26.0	G	9.2	52.2	3.6		9.1	37.4	56.3		8.5	41.5	54.6	
9.1	1.6	39.4		8.7	9.7	12.8		8.3	25 57.9	26.5	B	8.5	51.0	56.3	A	8.6	56.4	3.9	
9.2	8.3	53.5		7.0	58.9	14.4	G	8.0	26 50.0	42.7	R	9.5	39 35.0	40.5		8.0	52 11.0	52.9	B
9.5	18.5	30.7		9.0	17 6.0	48.3		9.1	27 8.6	39.1		8.3	42.1	23.7		8.5	14.2	11.2	
8.8	26.0	10.5		9.0	28.8	54.1		9.5	12.0	13.4		9.5	40 12.9	44.3		9.5	46.5	20.3	
8.4	41.7	36.9	A	8.9	18 11.6	41.9		8.3	17.4	15.8	G	9.5	41 6.5	20.6		8.8	53 6.1	29.4	A
9.0	10 13.0	39.0		9.5	26.4	40.6		9.3	33.2	3.0		7.8	15.4	53.8	A	9.0	20.2	0.8	A
9.0	37.2	46.8		9.5	19 30.2	41.3		9.4	28 24.9	5.3		8.4	46.9	3.3		9.4	54 2.9	3.8	
9.5	41.8	38.7		9.5	31.5	25.7		8.5	35.8	13.3	A	9.0	42 28.9	55.8	A	9.5	17.1	52.8	
9.3	11 4.0	20.2		8.5	20 5.4	45.9		8.8	46.4	26.0		9.3	46.4	54.4	A	9.5	42.8	37.1	
9.0	4.6	14.8		9.0	8.3	12.6		9.0	50.7	14.6	A	9.0	43 1.6	33.7		9.2	55 0.9	19.8	A
9.2	7.1	33.9	A	9.0	32.6	6.1		9.5	54.6	38.8		6.7	27.0	24.0	G	8.7	10.0	44.7	A
8.5	18.2	38.1	A	9.4	21 2.0	38.1		9.5	57.8	35.2		9.0	37.8	17.1		9.4	47.1	42.6	A
9.1	32.5	14.8		9.5	24.8	44.3		9.5	59.0	47.5		9.4	53.2	6.4		9.5	56.8	39.7	
8.9	35.1	19.1		9.3	44.7	1.8		8.4	29 23.0	40.0	B	8.9	44 7.2	12.9		9.5	56 47.0	18.6	
9.5	38.5	35.0		9.5	56.5	37.6		9.4	33.4	52.7	B	9.4	52.6	32.5		7.2	55.1	28.1	L
9.4	44.0	58.1		9.4	59.9	11.3		8.4	42.1	9.2	A	9.5	56.7	21.8		9.2	57 10.0	51.6	A
9.2	58.7	22.0	B	9.3	22 8.3	44.6		9.1	30 20.5	47.0		7.7	45 26.8	28.3	L	9.5	15.4	48.7	
8.8	12 0.4	36.5		9.5	22.0	47.8		8.5	44.6	32.1	A	8.6	35.6	25.0	L	9.0	30.5	58.0	A
9.3	3.9	18.6		9.5	23 14.9	55.7		7.2	31 56.1	38.4	A	9.0	47.2	28.3		9.4	34.7	52.5	
7.7	21.4	45.0	A	9.2	23.6	34.9		8.5	32 6.7	51.8	A	9.4	47 0.4	0.6		8.7	34.7	2.4	
9.1	22.5	59.2		9.2	24.5	0.5		9.5	18.6	53.2		8.4	11.3	43.9	L	9.4	58 4.8	42.0	
9.4	33.8	14.5		9.2	30.0	35.6		9.2	56.7	44.5		9.5	16.7	19.7		9.5	9.1	39.7	
9.4	34.5	21.6		8.5	44.2	27.7		9.4	33 2.0	58.2	R	9.2	31.8	19.3		9.5	26.8	52.4	
9.5	13 16.2	23.1		9.0	24 10.9	5.1		9.3	4.0	43.4		9.4	37.6	45.7	B	8.0	59 18.3	41.5	A
9.5	24.6	5.5		9.4	15.2	23.4		9.5	29.7	8.0		9.5	46.9	6.2		9.1	22.4	55.1	A
9.4	30.4	35.4		8.4	21.4	30.1		9.5	51.0	11.0		7.8	48.3	47.0	L	8.6	30.7	10.4	
9.5	49.4	50.3		9.5	32.4	17.2		9.0	34 22.5	33.5	R	9.5	49 8.0	53.2		9.0	42.5	57.2	A
9.5	50.3	36.1		9.5	40.9	0.3		9.4	25.8	13.2		9.0	14.1	15.5		9.2	53.3	12.4	
8.8	54.3	47.8		7.5	48.5	20.6	B	9.4	41.1	40.6									

Zone +54°

1—40				41—80				81—120				121—160				161—200			
	ou	+54°			ou	+54°			ou	+54°			ou	+54°			ou	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.9	0 17.9	45.7	L	9.5	13 42.4	55.6		9.0	22 26.0	2.3		9.2	29 48.2	30.5	A	9.0	41 11.0	46.5	
9.4	55.2	50.7		9.5	14 28.0	33.9		8.8	34.5	48.6		9.5	30 31.8	18.5		9.2	22.5	3.1	
9.5	1 13.8	51.3		9.3	28.0	17.6		8.8	35.0	36.2		9.5	43.2	57.0		9.5	23.2	26.3	
9.5	2 24.3	40.3		9.0	15 7.9	17.9		9.5	50.6	25.2		9.5	57.5	42.1		9.3	45.4	41.0	
9.5	25.2	20.5		9.0	10.8	14.7		8.7	54.4	28.9		9.0	32 9.0	57.0		8.8	42 15.4	42.2	
9.5	57.3	51.7		9.5	15.2	16.2		8.5	23 2.2	58.2		9.3	34.0	29.0		9.5	23.0	8.2	
8.3	3 7.5	4.8		9.5	23.0	16.6		9.0	3.1	51.1		8.6	40.5	11.6		9.5	43 7.0	55.8	
7.8	10.7	32.4	L	8.5	25.1	59.5	A	6.8	4.3	54.3	L	9.0	33 22.3	8.5		9.5	33.8	29.7	
9.5	50.5	51.6		8.0	36.0	59.6	A	9.2	10.9	6.1		8.2	31.6	53.2	B	9.0	56.1	50.2	
8.5	4 29.6	12.6		8.0	51.6	35.3		9.5	18.9	28.5		9.5	35.1	56.9		9.0	44 32.7	33.4	
8.3	35.2	17.6		9.5	16 18.4	39.2		9.0	19.0	29.9		9.5	44.5	6.0		9.0	54.1	59.1	B
9.5	57.7	7.7		8.4	32.0	47.2	A	9.5	31.5	1.6		9.4	50.0	9.5		8.3	57.6	50.2	L
8.8	5 0.9	18.1		9.5	17 6.1	55.0		9.1	32.4	13.2		9.5	55.4	39.3		8.2	45 30.1	15.8	
9.5	6 31.2	20.1		9.5	12.5	15.3		9.5	42.5	59.9		9.0	34 0.2	24.9		9.1	35.9	55.3	
9.1	33.8	48.8		9.4	14.8	11.0		9.1	46.2	42.8		9.4	20.8	50.1		7.9	43.1	57.6	L
7.5	35.7	28.0	L	9.1	21.5	17.6		9.5	24 35.0	59.0		9.4	33.4	9.4		9.3	46 2.5	40.7	B
8.4	7 9.5	10.1	A	7.0	51.4	11.9	A	8.1	34.2	24.9	B	8.9	55.7	30.0		9.1	13.0	3.6	
8.5	14.6	38.4		8.9	18 7.9	54.8	A	9.2	40.5	13.5		9.3	35 18.2	38.3		9.5	33.8	36.3	
9.0	19.2	53.9		7.4	14.8	41.3	A	8.0	44.7	27.6	B	8.5	43.4	49.6		9.5	36.5	42.7	
9.5	20.5	49.2		9.4	22.5	54.6		9.5	58.1	58.0		9.5	36 23.6	38.5		9.4	43.0	2.4	
9.3	42.0	13.1	A	9.5	22.7	8.0		6.5	25 10.5	5.9	L	8.9	25.2	7.4		9.5	54.3	48.2	
9.5	8 32.8	57.6		9.5	29.2	18.0		9.4	49.2	26.5		9.5	56.0	9.6		9.5	47 6.4	52.9	
9.5	52.5	55.2		9.3	38.9	58.7		9.4	55.7	9.5		5.8	37 2.1	26.0	A	8.1	41.2	35.0	L
9.5	9 24.7	28.5		9.5	40.4	48.9		8.0	26 0.4	8.2	L	8.0	34.2	11.2	A	9.2	42.3	34.5	B
7.5	32.3	10.7	A	9.0	19 0.0	2.3	A	9.4	4.2	12.6		8.8	36.1	30.5	A	8.5	43.0	3.9	
9.0	10 25.8	37.5	B	8.0	20 11.8	27.0	A	9.2	12.5	55.2		9.4	40.4	55.7	B	9.5	48 11.9	8.9	
8.5	30.3	39.9	L	9.5	22.6	12.8		9.2	20.2	8.6	B	9.3	41.0	4.4		7.2	46.5	9.9	L
9.3	38.9	43.3		9.5	24.1	54.6		9.5	38.4	26.0		7.3	58.4	30.8	A	9.3	49 0.8	58.4	
9.3	39.6	49.2		8.9	50.5	47.4		9.4	57.8	1.6		9.4	38 13.2	38.9		9.5	6.1	42.5	
9.5	40.9	4.2		8.8	55.5	53.0		8.8	27 36.7	30.8		9.5	23.5	3.9		9.5	12.5	32.5	
9.5	41.6	30.0		8.8	57.4	40.2		7.6	44.8	54.7	A	8.9	24.8	20.2	A	9.0	13.8	39.4	
9.5	55.1	4.4	B	8.3	21 8.0	1.2	A	9.4	56.7	44.8		9.0	48.4	51.1		9.5	15.0	56.4	
9.5	11 19.5	37.5		9.0	27.2	56.3	B	7.5	28 1.9	3.2		9.2	39 0.4	29.4		9.5	47.4	58.7	
9.3	22.8	44.8		9.2	31.0	46.2		9.4	43.6	7.3	B	9.0	5.9	45.8		9.5	50 56.4	42.5	
8.4	50.9	50.3	L	9.0	31.8	34.1	L	6.8	45.0	9.9	R	9.5	22.4	45.3		9.0	51 13.2	48.4	A
8.3	55.2	52.6	L	9.5	33.0	19.8		7.8	58.4	25.7	A	9.0	40.0	6.3	R	9.3	34.5	42.4	
7.5	12 7.2	54.6	L	9.2	42.5	55.3		8.3	29 0.2	37.5		9.3	42.4	44.9		8.7	36.9	30.3	A
9.5	33.2	35.0		9.1	59.5	0.3		9.4	6.4	23.0		8.5	40 11.5	0.6		9.5	38.6	32.2	
9.4	43.8	22.5		9.5	22 2.4	12.8		9.2	6.7	41.4		9.4	59.0	35.4		9.5	59.9	37.7	
9.2	45.0	6.6		8.9	4.0	35.6		7.7	26.8	26.0	A	9.4	41 3.0	2.0		9.2	52 13.5	57.8	

201—260				261—320				321—380				381—440				441—500			
	0u—1u	+54°			1u	+54°			1u	+54°			1u	+54°			1u—2u	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	52 23.2	31.7		9.0	10 1.5	47.6		9.3	25 20.5	10.6	A	9.3	39 34.9	26.1	B	8.8	52 47.2	55.3	B
9.5	32.3	3.3		9.5	16.1	38.7		9.3	26 33.6	36.3		9.4	41.8	21.6		9.5	52.6	10.4	
8.8	35.3	44.8	A	9.5	34.5	1.7		9.4	45.1	17.1		8.9	45.1	25.1	B	9.5	53 5.6	28.1	
8.9	36.5	36.6	A	9.5	11 18.2	22.7		9.1	52.4	13.7	R	9.5	40 21.9	50.7		7.9	27.7	31.8	B
9.2	38.2	56.9		9.4	18.3	58.8		8.4	53.5	1.4	A	9.2	33.2	8.9	B	9.3	29.6	27.9	
9.4	59.9	3.5		9.4	31.0	18.2	B	9.5	27 8.5	59.9		9.3	53.2	4.4		9.5	36.5	13.1	
8.9	53 0.4	25.8	A	9.4	32.1	13.0		9.4	25.7	19.9		9.5	57.6	6.7		9.5	51.4	32.6	
9.5	5.0	55.0		7.0	44.1	12.1	L	8.8	50.4	9.0	A	8.4	41 4.7	28.7	L	8.9	54 7.5	25.0	
9.3	54 4.2	42.9		8.9	12 10.0	35.6	B	9.1	28 2.5	50.0		9.0	11.8	13.0		9.2	13.4	7.2	
9.3	7.1	20.4		9.4	16.7	29.7		9.5	8.4	47.2		9.4	19.5	50.5		9.3	20.6	51.7	B
9.0	56.9	15.0	A	9.2	18.7	38.3		7.3	12.5	19.4	A	9.5	37.1	0.7		9.3	44.6	9.7	
9.5	55 16.1	49.2		9.5	14 0.0	56.1		9.4	15.8	26.8	B	8.4	49.6	41.0	L	8.5	55 0.6	3.8	L
9.1	29.1	12.5	A	9.5	10.2	52.1		8.6	22.4	26.7	B	7.4	42 0.1	11.1	G	6.9	17.9	55.7	L
9.3	43.1	17.3	A	8.9	15.4	50.8	A	9.5	29.3	36.0		8.0	12.7	13.2	G	9.5	21.3	3.9	
8.0	56 10.4	59.9	A	9.5	15 6.3	3.0		9.5	35.9	0.4		9.5	20.9	45.0		9.5	24.2	48.3	
9.5	19.1	15.1		9.4	23.5	3.6		9.5	42.0	51.9		5.7	30.3	25.7	G	9.5	56 2.0	51.2	
9.2	56.0	3.2		9.5	28.7	41.6		9.5	29 18.8	0.5		9.0	47.5	40.5		8.9	8.6	13.9	B
9.5	57 14.5	47.5		9.2	37.4	56.3		8.9	21.3	29.6	A	8.6	55.7	36.7	J	9.5	28.5	49.8	
9.4	29.1	17.8		8.8	37.9	20.7	A	9.5	24.3	6.2		9.3	43 4.0	53.0		9.2	33.8	12.9	
9.0	46.6	28.6		9.0	46.6	12.7		9.0	26.8	29.1	A	9.1	5.4	35.3		9.5	59.0	37.2	
9.2	58 1.5	25.9		9.5	47.8	45.7		9.4	30 10.3	36.6		9.5	8.0	28.6		9.5	57 37.6	25.0	
9.3	27.6	44.1		8.0	54.2	8.9	A	9.1	17.5	46.1		9.5	21.6	2.6		9.1	58 6.8	42.9	
5.7	41.0	12.0	G	9.5	16 14.7	9.5		9.3	26.8	27.8		9.5	31.2	51.5		9.3	10.8	19.5	
9.5	59 16.8	52.2		8.4	33.0	12.3	A	8.3	37.3	53.7	R	9.5	40.4	24.3		9.2	36.9	32.6	B
7.7	31.0	22.9	A	9.5	17 20.0	37.2		9.5	48.6	10.0		9.5	43.3	52.8		9.4	46.8	31.6	
9.1	32.5	4.3		9.2	20.5	39.6		8.2	53.3	20.2	A	9.5	55.7	38.8		9.3	48.9	31.1	
9.5	33.6	9.0		9.5	55.3	3.2		8.2	31 1.3	6.4	A	9.5	44 2.5	1.5		9.5	59 26.6	47.8	
9.5	41.0	54.9		9.5	59.9	28.7		9.5	18.0	0.7		6.6	14.3	52.9	L	9.3	51.8	11.8	
9.5	0 7.8	54.2		9.5	18 2.0	49.0		8.9	18.2	25.9	A	9.5	51.9	28.8		8.5	0 7.4	47.9	
9.5	15.1	46.4		9.5	18.0	55.9		7.5	19.0	12.3	A	9.5	58.3	13.3		9.0	24.9	36.0	
9.5	31.1	13.5		9.2	23.3	51.2		9.1	40.7	39.6		9.5	45 7.0	49.0		9.2	29.4	28.5	
9.5	1 35.0	26.6		9.2	26.0	13.1	A	9.5	45.0	16.4		9.1	10.1	25.6		9.5	1 3.1	27.8	
9.5	35.1	19.7		9.5	28.3	56.4		9.5	53.3	18.1		9.0	16.8	0.7		9.4	19.3	15.8	
9.5	37.3	32.2		9.5	46.6	49.5		9.5	32 3.8	48.2		9.5	44.7	7.0		9.0	35.5	14.6	
9.5	46.6	57.3		9.0	19 32.1	25.5		9.5	34.1	57.9		8.0	46 10.2	52.0	L	9.5	53.0	42.6	
4.8	2 18.0	22.6	A	9.5	35.4	36.3		9.4	45.2	13.3		8.6	12.4	45.9	L	9.5	56.4	52.5	
9.4	33.5	38.1		8.0	48.1	31.0	L	9.5	48.9	23.2		8.2	34.3	56.7	L	9.2	59.2	20.9	
9.5	57.0	6.5		9.5	54.0	36.9		9.2	57.3	7.8	A	9.5	42.7	18.1		9.0	2 1.0	16.6	
9.4	3 23.0	14.0		9.0	20 3.9	52.9		9.5	33 26.0	42.3		9.2	55.4	37.4		9.5	20.6	36.4	
9.3	4 3.4	39.7		8.4	45.7	5.8		9.5	37.3	21.8		9.4	59.1	25.2		9.5	32.6	27.4	
9.1	11.3	58.4		9.5	48.0	38.1		9.5	39.1	11.1		9.4	47 0.4	20.4		9.5	39.2	47.3	
9.4	18.1	40.7		8.8	53.8	15.7		9.1	57.4	29.5		9.4	12.3	33.2		9.1	59.9	40.0	
9.4	44.2	39.1		9.5	54.9	41.2		9.5	34 10.2	20.2		9.5	48 5.8	11.1		8.9	3 9.1	25.6	A
9.0	49.1	48.7	A	9.5	21 13.0	20.6		8.8	12.6	28.5		9.2	15.9	39.5	A	9.3	23.0	26.4	A
9.5	56.5	7.5		9.5	27.6	16.9		8.4	21.3	52.8	A	9.5	45.1	45.3		9.4	24.7	29.4	
9.3	5 26.8	46.0		9.5	22 1.9	16.2		9.5	23.0	26.0		9.5	52.2	15.4		9.5	35.9	10.5	
9.3	32.0	50.2	B	9.5	16.2	47.5		9.0	47.2	11.9	A	9.5	49 3.4	13.2		9.5	44.5	46.6	
9.3	44.8	3.1		9.2	23 4.1	0.8		7.5	55.3	9.1	A	9.4	11.5	35.0		9.0	59.8	10.3	
9.4	48.5	53.0		9.3	4.1	32.9		9.3	35 1.4	44.0		7.6	11.9	52.3	A	9.5	4 27.0	19.9	
9.5	6 31.1	51.4		9.3	20.2	32.1		8.4	38.0	25.7	L	9.5	45.4	42.5		9.2	27.4	22.2	
9.5	34.7	7.3		9.2	35.6	16.7		9.0	39.2	6.2	A	9.0	59.7	7.0		8.5	33.7	13.2	
9.3	7 16.5	44.1		9.2	56.1	41.0	A	8.5	36 40.1	36.6	L	9.4	50 22.0	16.0		9.5	34.7	54.1	
8.0	25.4	30.2	A	9.4	24 4.6	35.5		9.0	48.5	2.2	A	9.5	50.8	51.7		9.5	35.0	30.2	
8.5	28.1	46.9	L	9.1	10.0	43.4	A	9.5	56.4	13.7	R	9.4	51 23.3	18.6		7.9	39.4	38.1	B
9.5	30.8	59.0		7.0	18.0	12.0	A	9.4	37 4.6	2.0	A	9.5	50.5	4.6		9.5	57.2	58.2	
9.2	8 38.2	13.0		9.4	18.0	55.0		9.1	47.1	44.2		9.5	52 2.6	7.8		9.5	5 6.1	53.0	
8.8	46.4	11.2		9.0	26.6	55.0	R	8.6	38 0.9	57.4	L	9.5	13.8	43.7		6.9	14.5	24.6	A
7.5	57.4	40.4	L	9.5	25 5.5	2.7		9.5	9.2	41.6		9.0	19.0	5.4	B	9.5	26.6	36.8	
9.5	9 11.3	58.7		9.5	6.7	15.4		8.0	59.4	58.3	L	9.1	27.2	1.5		9.5	27.8	48.7	
9.0	45.2	26.8		9.5	15.1	31.2		8.2	39 31.9	12.5	R	9.5	41.7	42.6		7.8	31.6	54.8	A

501—560				561—620				621—680				681—740				741—800			
	2u	+54°			2u	+54°			2u—3u	+54°			3u	+54°			3u—4u	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	5 32.7	39.5		6.5	20 38.2	54.0	A	7.7	46 25.5	54.9	R	9.5	16 34.2	49.3		9.0	58 56.6	38.3	
8.3	48.3	10.2	A	8.5	38.4	31.2	A	9.2	25.6	3.3		8.6	17 2.4	40.0		8.5	59 0.4	17.1	
9.3	6 9.5	50.1		9.0	21 12.6	18.5		8.8	27.0	37.5		8.1	18 10.8	2.0	B	9.5	45.8	59.6	
9.5	9.6	37.5		8.4	23.3	38.2	A	9.5	43.7	27.7		4.8	59.4	57.2	A	9.5	0 4.4	1.8	
9.5	35.8	44.9		9.0	23.7	15.5		9.0	47 43.4	35.9	B	7.5	19 11.5	52.6	A	7.5	1 26.3	2.3	A
9.4	41.7	50.3		9.5	50.5	20.0		9.2	51.5	42.5		9.5	26.3	24.0		9.2	32.6	37.3	
9.5	51.4	19.1		6.5	59.1	48.8	A	9.5	48 54.3	52.7		9.4	53.1	30.5		9.5	33.2	55.8	
8.3	7 14.9	12.3	A	9.5	22 11.0	57.2		9.4	49 22.6	17.4		9.5	20 11.4	5.7		9.4	57.3	6.9	
9.1	28.2	38.2		8.0	42.7	41.5	A	8.0	28.5	37.0	A	8.7	21 35.6	41.0	A	7.0	2 59.5	8.5	A
9.5	8 10.6	35.2		9.0	23 2.1	32.5	A	8.5	30.1	4.0	A	9.3	22 1.5	21.8		9.5	3 20.6	39.3	
8.1	30.7	52.0	A	9.5	9.5	23.8		9.1	50 19.8	1.4		9.5	10.1	6.5		8.0	45.1	36.8	A
9.5	48.9	16.8		9.5	16.6	43.0		9.5	33.9	36.1		9.5	14.0	13.0		8.8	54.5	36.8	A
9.5	51.8	8.4		9.5	34.0	19.8		9.4	51 34.5	47.8		6.0	38.1	27.7	A	9.5	4 15.5	20.5	
9.5	9 21.6	28.6		9.5	55.6	57.2		9.2	52 43.5	48.8		9.5	25 51.6	48.3		9.5	16.2	2.9	
9.5	28.2	20.1		9.5	24 16.1	44.0		9.3	53 14.5	49.4		9.5	59.4	15.0		9.5	31.8	4.9	
9.5	30.7	21.6		9.5	42.6	25.2		9.3	55 38.4	9.4		9.0	26 17.8	3.5		9.5	5 2.4	40.7	
9.5	33.6	21.0		9.5	43.5	16.5		9.3	49.6	51.4		9.5	31.7	18.7		8.2	6 26.8	6.3	B
9.2	39.8	8.8		9.5	25 0.2	31.7		8.8	59.8	8.7		8.3	54.0	41.2	L	9.0	7 22.2	16.3	B
9.5	48.0	30.1		9.5	15.7	7.6		9.4	57 52.0	49.0		9.4	57.1	34.2		9.5	49.7	4.5	
9.5	55.5	52.4		9.5	50.5	4.6		9.4	58 17.2	32.6		9.5	28 21.6	10.0		9.2	8 25.8	2.6	
9.5	57.6	3.6		8.7	52.3	54.0		8.9	59 14.0	44.3		9.4	29 18.3	58.4	B	8.9	9 41.5	50.9	
9.5	10 2.5	19.4		9.4	26 9.6	29.2		9.3	20.0	31.7		9.5	30 25.1	34.5		9.0	57.6	56.4	
9.3	41.8	18.4		9.5	15.2	12.5		9.5	35.4	14.4		8.4	54.2	26.5		9.3	10 18.3	51.2	
8.5	50.6	39.0	A	9.2	46.1	58.3		9.4	0 36.5	50.0	B	9.3	31 1.1	7.9	B	9.0	28.8	9.9	
7.0	59.3	44.4	A	9.5	28 34.3	36.4		9.3	53.4	27.1		8.9	4.8	7.4	B	9.5	46.1	23.2	
9.0	11 2.3	45.4	A	9.2	35.6	34.2	B	9.5	1 7.9	4.2	B	9.5	32 11.7	51.7		9.0	14 0.5	28.9	A
9.5	18.6	57.3		9.5	54.1	33.1		9.5	23.5	19.3		6.5	34 39.5	35.5	L	9.5	36.0	34.8	
9.5	25.2	52.8		9.0	29 20.4	19.5	B	8.0	2 2.3	47.3	B	9.5	48.9	39.8	B	8.9	52.1	22.9	A
9.5	32.4	32.8		9.5	33.2	19.2		9.0	14.1	12.5		9.4	36 14.1	13.8		9.5	16 17.0	50.0	
9.2	12 39.0	24.9	B	9.5	50.3	22.2		9.5	59.3	57.6		8.5	34.7	19.8	A	9.4	24.0	19.1	
9.5	47.7	41.4		8.8	30 0.6	22.3	B	9.0	3 8.5	23.4		8.5	50.3	35.5	A	8.5	31.5	15.7	A
9.5	13 4.6	32.8		8.5	2.1	40.6		8.7	15.4	12.3		9.5	38 4.7	3.0		9.5	17 13.8	10.8	
9.4	11.1	56.7		9.4	11.3	18.8		9.5	4 12.0	17.9		8.0	32.6	15.8	A	7.5	18.3	41.7	A
9.5	13.6	51.8		8.9	31 7.7	32.7		9.1	14.1	3.7		7.8	39 31.1	20.2	A	9.0	19 39.5	45.1	
6.4	50.4	41.8	L	9.4	19.1	8.1		9.3	26.9	20.5		8.0	38.5	54.2	A	9.5	20 1.5	21.5	
9.5	14 5.1	52.3		7.3	20.2	51.7	A	9.5	39.0	21.5		9.5	53.1	47.3		9.5	12.0	6.8	
9.5	17.4	8.0		9.5	46.3	59.6		8.7	5 13.4	45.9	B	8.0	40 5.6	15.3	A	9.1	54.8	39.2	
9.4	19.5	6.6		6.0	32 45.0	29.7	A	9.1	6 30.6	10.6		9.5	42 42.7	59.0		9.5	22 52.5	18.2	
7.0	15 9.5	35.8	L	9.2	33 41.1	28.3		9.5	52.7	59.1		9.4	43 2.0	28.1	B	9.5	23 0.5	20.6	
9.2	31.0	47.9		9.5	48.2	3.4		9.5	7 0.0	39.0		9.5	33.1	46.8		9.0	49.1	1.6	
9.5	53.3	20.9		9.5	34 30.0	18.5		9.0	16.2	27.1		9.5	44 15.7	17.8		9.5	24 35.9	20.5	
9.5	55.2	47.5		8.0	40.1	20.5	A	9.4	54.0	47.4		9.1	45 27.9	28.0	A	8.5	38.7	41.6	
9.5	16 8.5	3.4		8.5	35 51.5	49.3		9.5	56.3	6.8		9.5	34.2	2.4		9.5	25 2.4	8.4	
9.5	23.1	22.3		9.1	37 4.0	59.3		8.4	8 5.1	51.7	B	9.5	46 9.5	28.5		9.5	33.0	0.4	
9.4	28.1	10.1		8.3	25.1	19.4		8.6	8.5	39.6		9.5	47 2.3	47.8		8.2	26 17.0	1.7	B
9.4	30.5	43.0		7.3	30.0	59.3	A	9.5	9 30.0	51.8		9.4	48 7.9	59.8		9.3	21.5	1.5	
9.4	39.7	26.3		9.5	38 12.5	41.0		9.3	58.4	5.6		9.5	49 31.0	2.7	B	9.0	43.0	3.8	
9.0	17 16.5	21.0		9.4	43.6	37.7		9.5	10 1.8	34.0		9.5	33.2	48.6		9.1	27 4.0	2.5	
9.5	58.6	29.1		9.5	49.8	5.1		9.5	23.5	37.9		9.3	50 13.1	26.9		9.5	23.9	1.[illegible]	
9.5	18 2.9	55.4		7.5	39 30.4	53.0	A	9.5	59.1	44.8		9.1	35.2	4.6		9.3	44.0	32.[illegible]	
9.5	28.0	42.0		9.4	40 7.8	12.8		9.5	11 33.1	50.8		9.0	51 23.0	3.5		9.4	28 22.4	58.[illegible]	
9.5	29.7	56.4		9.5	25.6	8.5		7.0	12 8.2	42.0	L	9.5	56.1	37.8		9.2	24.3	7.[illegible]	
9.3	34.0	59.4		7.9	27.6	3.7	A	9.4	39.7	49.8		8.7	52 4.4	18.6		9.5	29 8.0	26.[illegible]	
8.2	39.9	19.3	B	9.5	56.5	42.0		8.5	54.5	4.4	A	7.0	53 13.6	40.2	A	9.5	55.4	49.[illegible]	
9.3	56.1	32.4		8.8	41 7.6	20.9		9.3	13 1.2	2.9	B	8.5	25.1	35.8	A	8.0	30 10.0	22.[illegible]	
9.5	19 10.2	44.2		9.5	40.5	39.0		9.5	35.1	30.6		9.0	54 22.8	35.8	B	9.5	35.4	4.[illegible]	
6.5	14.8	53.2	A	9.5	44 26.0	21.1		9.5	57.3	57.0		9.5	55.0	3.3		9.5	36.0	16.[illegible]	
9.5	37.1	59.7		9.1	29.5	25.5	B	9.4	14 23.7	58.2		9.5	55 39.6	49.6		9.5	31 47.3	19.[illegible]	
7.3	20 2.7	41.4	A	9.4	45 13.0	29.7		8.4	24.3	9.3	A	9.5	57 26.1	46.6		9.0	32 8.8	59.[illegible]	
9.4	29.4	2.6		9.3	23.1	20.3		9.5	16 15.2	16.1		6.0	58.2	25.9	A	9.5	10.7	54.[illegible]	

801—860				861—920				921—980				981—1040				1041—1100			
	4ᵘ	+54°			4ᵘ—5ᵘ	+54°			5ᵘ	+54°			5ᵘ—6ᵘ	+54°			6ᵘ	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	32 13.5	26.5		9.0	54 50.4	8.3	A	9.4	27 31.7	45.0	A	9.5	53 34.8	18.7		8.0	19 35.9	58.1	A
9.5	34.4	3.9		7.5	56 1.2	47.8	S	9.3	42.5	38.7		9.4	54 11.3	1.9		8.1	20 11.0	52.1	A
8.5	40.6	15.4	B	9.5	19.7	12.3		9.4	28 40.7	27.9	A	9.5	25.7	45.1		7.8	21.7	56.5	A
9.5	46.9	3.7		9.5	57 50.8	39.6		9.0	29 25.7	13.0	A	9.4	26.8	4.4		9.0	21 38.3	34.3	
9.4	33 54.5	57.9		9.4	58 12.3	20.8		9.5	57.4	44.5		9.5	59.0	54.1		8.9	55.8	10.2	
9.3	34 9.5	59.9	B	9.1	59 32.5	29.1		9.3	30 2.0	14.6	A	8.8	55 27.2	41.1		9.5	22 4.0	19.6	
8.8	16.9	53.5		9.5	0 55.3	19.7		9.4	2.8	59.7		9.4	59.3	28.5		9.5	23 0.2	57.8	
9.2	37.1	59.9	B	9.1	1 38.8	37.0		8.5	36.7	44.5	G	8.2	56 6.8	55.8	A	8.0	19.9	10.4	A
8.3	42.4	32.4	L	9.5	54.9	10.2		9.4	31 0.6	3.8		8.8	14.7	28.2		9.4	49.5	29.6	
8.7	44.3	50.1		8.5	2 20.0	36.0		9.2	7.2	9.7	A	9.3	46.8	54.0		8.3	52.7	41.6	B
8.5	51.3	48.0	L	9.3	31.0	13.5		9.1	48.8	21.9	A	9.5	57 25.9	49.5		9.5	24 29.9	8.6	
9.0	35 8.9	57.9		9.4	3 59.9	23.0		7.0	32 1.5	46.5	A	8.9	58 43.2	2.9		8.9	27 18.8	1.6	A
9.3	12.4	45.8		9.5	5 6.0	5.2		9.3	27.1	58.8	B	9.0	59 17.2	51.2		8.8	36.5	3.6	A
9.5	18.0	31.8		7.5	11.8	0.2	B	9.4	33 3.6	48.9		9.2	0 18.8	20.0		9.1	36.6	45.4	
9.1	25.9	45.5		9.4	26.0	49.5	A	8.7	12.5	42.0	A	8.5	22.8	45.6	A	9.0	52.8	7.5	
9.5	46.2	3.2		9.5	30.0	33.2		8.0	43.7	0.3	A	9.4	24.3	39.5		9.5	28 16.8	23.2	
8.7	36 4.3	51.6		9.4	53.0	23.7		9.0	49.3	21.4		8.9	1 0.5	0.0	A	9.3	18.6	56.6	
8.8	24.4	32.7		8.5	58.4	13.5	B	9.3	34 13.6	48.5		8.4	44.8	42.7	A	8.8	29 42.0	8.6	A
8.8	37.4	33.5		8.3	7 31.2	46.3	A	9.4	14.6	40.0		9.5	50.0	54.9		9.5	30 20.9	23.7	
9.5	37 6.5	51.9		8.0	8 28.5	53.8	A	9.3	27.1	9.7		9.0	58.4	8.9	A	8.3	49.4	33.5	A
9.4	41.9	11.1		9.3	39.7	40.8		9.5	35 34.2	32.6		9.4	2 6.5	53.0		7.5	31 24.7	14.7	B
8.9	55.0	56.0		6.3	9 30.2	6.0	A	6.5	42.1	24.0	A	9.5	14.3	20.1		9.1	25.8	56.8	
8.8	38 16.6	47.5	B	9.5	50.9	54.8		9.5	44.0	35.4	B	9.2	3 14.4	14.2		9.0	27.9	7.6	
9.5	18.5	44.5		9.3	10 46.3	40.8		9.5	44.7	33.4		9.5	4 23.8	44.2		9.0	51.4	0.2	
9.5	41.7	25.3		9.4	11 11.9	53.6	B	9.5	36 14.0	54.5		8.5	29.7	4.6	A	9.2	58.2	48.3	
9.0	57.2	21.1		9.2	22.0	40.0		9.4	33.8	42.0	B	9.5	5 37.3	22.0		9.4	32 19.9	9.1	
8.0	39 24.9	10.2	A	9.2	12 11.2	50.0		9.1	37 9.5	44.0		9.5	6 4.2	41.7		9.0	20.1	50.2	
9.0	49.0	44.6	A	9.2	58.6	25.7		9.2	24.6	12.5		9.3	14.3	51.5		8.9	33 34.3	59.7	B
8.0	40 11.0	39.8	A	9.5	13 18.4	17.2		9.3	38 7.6	0.1	B	9.0	7 15.2	13.7		9.5	36.5	57.7	
9.5	56.5	41.1		9.4	30.0	0.2		9.5	16.7	47.5		9.4	56.8	18.0		8.5	43.9	28.7	
8.0	41 14.6	46.8	A	9.5	14 12.3	53.8		8.5	39 4.2	38.2		9.5	59.3	43.2		9.3	34 53.0	45.9	
8.5	15.0	16.0	A	9.2	15 32.0	14.3		9.1	40 45.2	18.0		8.9	8 6.0	18.2	B	8.8	35 4.4	29.1	
9.5	39.6	30.4		9.3	16 35.3	36.3		9.0	41 22.7	33.7		9.5	21.8	6.4		9.1	19.8	15.9	A
9.5	42 14.3	27.5		8.5	51.7	49.1	A	9.2	42 19.2	27.5		7.5	24.7	18.3	B	9.5	37 11.0	19.8	
9.5	35.4	2.9		9.4	17 32.6	30.3		9.5	43 35.6	7.2		9.2	9 14.8	58.4		9.4	25.4	8.6	
9.5	45.8	52.0		7.5	37.9	1.5	A	9.0	46.3	48.9		9.2	46.7	5.9		8.8	38 8.2	24.5	A
9.3	44 46.0	10.8		9.5	52.4	40.2		9.0	52.6	9.6		8.9	49.5	30.2	B	7.8	39 15.9	34.6	L
9.5	45 15.2	25.5		9.5	18 28.3	47.1		8.8	44 5.7	28.4		9.2	10 0.9	18.6		8.5	41.3	21.9	B
9.5	36.4	0.6		9.5	43.8	35.8	B	8.3	29.1	13.7		8.5	14.7	42.7		8.5	40 40.4	10.9	F
9.5	58.5	24.5		9.5	48.3	52.7		9.0	29.8	23.4		9.5	15.8	36.8		9.5	41 10.5	22.7	
9.3	46 23.8	57.0		9.1	53.6	25.4		9.5	54.8	59.1		9.0	59.2	8.4		9.5	42 20.3	51.3	
9.1	47 33.7	38.5		7.6	19 36.6	31.7	S	9.4	45 13.2	5.4		9.2	11 3.4	12.4		9.0	43 4.9	25.9	A
9.5	48 30.9	20.1		8.9	54.2	39.6		8.8	14.4	43.0		9.5	23.5	50.9		8.5	14.0	48.3	A
9.3	49 1.0	3.1		9.3	20 5.7	14.6		9.3	22.7	57.2		8.9	42.8	0.4	A	9.4	15.4	17.9	
8.7	4.7	21.2	A	9.5	30.4	57.1		9.5	33.6	9.1		9.1	13 11.7	50.0		9.2	26.8	55.9	
8.9	6.3	36.9	A	9.3	21 20.4	8.3	B	9.0	40.2	48.0		9.0	57.8	35.9		9.4	50.3	43.7	
9.1	11.0	18.9		9.4	24.6	17.9		9.3	41.0	26.8		8.4	14 21.7	25.0		8.9	44 33.2	24.9	B
9.3	50 3.9	24.2	A	9.4	29.1	13.8		9.5	51.4	52.4		9.5	15 9.4	43.0		9.5	55.9	37.4	B
9.5	19.0	25.8		9.4	30.8	35.1	B	9.1	46 42.9	28.9		9.5	47.5	42.1		8.8	45 13.0	47.4	
8.8	41.4	9.9		9.3	22 21.1	51.7	B	4.0	47 37.0	15.4	A	8.7	16 21.8	57.1	A	8.0	25.5	27.7	A
8.7	42.8	38.0	A	8.8	41.4	36.7		7.0	51.2	32.0	A	8.8	33.8	19.6	A	9.4	46 3.9	1.2	
7.8	51 27.7	42.8	A	9.5	23 19.3	28.4		9.3	56.2	17.2	B	8.3	34.4	28.0	A	8.8	23.9	39.9	
9.3	47.3	39.0		9.4	24 20.2	49.0		8.5	48 6.6	22.3	A	9.2	46.7	39.1	A	8.9	47 29.4	17.4	
9.2	58.2	32.4	B	6.0	42.0	18.5	A	9.3	22.3	12.2		9.5	55.2	17.7		9.4	31.0	11.0	
9.5	52 2.8	24.7		9.5	55.4	31.7		8.7	38.7	48.7		8.0	17 7.4	50.5	A	8.8	59.2	54.2	
8.0	19.7	39.9	A	9.5	25 33.6	3.2		9.0	49 15.4	33.0		7.9	11.8	41.7	A	9.1	48 3.0	36.5	
8.4	48.7	46.4	A	9.5	26 16.2	19.5		9.4	33.6	49.0		8.4	12.5	28.0	A	8.5	35.4	38.1	
7.6	54 28.7	55.5	L	8.5	25.4	51.4	A	9.0	48.8	32.4		9.0	23.2	23.6	A	8.8	49 52.8	23.7	
7.2	36.9	11.1	A	9.3	27 7.3	0.4		9.3	52 9.3	29.4		8.7	49.9	52.1	A	9.2	50 2.0	36.6	
9.4	37.8	39.0		8.8	16.6	7.7		9.3	53 19.3	25.0	A	9.1	18 4.8	50.8		7.5	51 14.9	14.4	A

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	6h—7h	+54°			7h—8h	+54°			8h	+54°			8h—9h	+54°			9h—10h	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.8	51 19.4	21.7	A	9.4	25 49.8	47.8		9.1	13 56.3	36.4	R	9.4	59 51.8	41.0		9.5	48 54.1	29.0	
9.3	53 16.5	12.4		9.5	52.5	45.7		8.4	59.0	58.5	A	8.8	3 51.2	39.5	A	9.3	49 51.0	5.1	A
9.5	54 2.3	13.9		9.3	26 31.8	53.9		7.5	14 6.4	23.1	A	8.5	4 41.8	5.4	B	9.4	50 11.7	4.1	A
9.5	38.8	24.5		9.0	27 4.0	51.9		8.9	16.9	28.1	R	8.6	5 18.9	54.7		8.5	51 55.6	20.2	
9.0	42.7	28.6		9.2	5.3	45.7		7.8	15 58.9	6.8	A	5.7	45.3	37.5	A	8.9	52 29.5	3.4	A
8.2	55 8.4	42.2	A	9.5	36.0	15.4		9.2	16 6.4	0.5	A	9.1	6 11.0	1.2		8.8	53 28.6	33.9	A
9.1	19.1	47.7	A	7.0	42.0	12.8	A	8.8	17 48.6	15.9		9.4	7 30.8	22.3		8.2	50.6	4.0	A
8.5	56 43.2	20.7	A	8.0	28 25.3	46.8	A	7.3	50.5	20.5	L	9.5	8 1.9	52.7		6.2	54 56.1	34.9	A
8.0	57 30.7	14.3	A	8.6	46.7	24.6	A	9.4	18 24.1	24.4		9.2	43.8	41.9	A	9.5	55 2.7	54.0	
8.4	46.2	34.9	B	8.8	30 36.3	58.7	A	9.3	19 8.8	58.0		9.5	9 19.9	24.7		9.3	56 15.3	18.2	
8.5	58 56.6	35.9		8.7	31 19.7	56.6	A	7.2	33.7	36.5	A	9.4	45.9	21.3		9.0	58 21.6	42.3	
9.5	59 18.0	42.7		9.5	26.3	42.8		9.1	20 2.5	25.0		8.5	11 28.5	22.3		9.3	1 33.3	0.5	B
9.5	31.5	53.3		9.4	34 8.4	30.1		8.7	3.8	34.5	A	8.3	40.3	13.9		9.2	2 29.1	12.3	A
9.1	33.1	4.2		9.4	36 25.3	54.9		9.2	11.1	18.5		9.2	44.4	11.9		8.8	45.6	55.9	A
9.0	58.4	0.5	B	8.5	37 17.3	2.0	A	9.2	21.5	56.8		9.0	12 12.9	11.5		8.0	58.1	12.3	A
8.4	0 2.0	23.1	B	9.0	39 39.3	6.0	A	9.3	37.4	18.2		9.5	14 34.8	51.2		8.5	3 26.6	12.3	A
9.4	39.7	5.0		6.3	40.3	28.7	G	9.1	41.5	5.5	B	8.0	42.2	0.5	B	9.2	37.7	40.8	
8.8	46.2	8.0		9.5	40 48.8	51.7		8.5	42.3	2.5	A	9.3	15 10.7	44.3	A	9.4	4 47.0	51.6	A
6.8	1 22.7	42.2	G	9.5	41 24.4	6.9		9.5	22 28.6	39.6		7.5	21.1	39.0	A	8.4	59.6	16.7	
9.3	41.0	27.0		9.4	43 47.3	32.0		9.1	47.1	11.2	A	9.3	44.4	19.9	A	8.0	5 10.7	29.1	B
9.3	45.3	41.7		9.4	44 35.2	5.5		9.2	49.7	5.8		8.8	48.8	21.3	A	9.4	9 6.2	51.9	
9.1	2 6.9	26.5		9.0	53.8	6.6	A	9.4	23 58.1	7.3		9.3	50.4	24.6	B	9.0	19.6	12.8	
9.3	13.8	50.3		9.4	46 30.3	47.3		9.1	24 29.5	11.1		9.5	17 17.0	38.0		8.5	35.1	31.0	L
9.0	30.9	10.4	A	9.5	38.0	55.7		8.6	52.2	12.6	A	9.2	18 15.5	45.2	B	9.3	10 4.4	55.5	
9.5	59.0	57.5		9.0	47 43.3	26.7		9.2	26 22.1	25.4		9.0	25.4	50.8	A	8.5	11.6	15.2	
9.0	3 6.1	52.5		9.0	48 14.8	42.8		9.2	42.0	17.4	B	8.7	28.3	26.7	A	7.0	52.1	30.9	L
9.5	5 12.2	19.7		9.3	49 9.9	45.8		8.5	27 46.1	13.1	A	8.5	19 32.4	45.4	A	6.5	11 7.7	56.3	A
8.6	17.3	30.9	A	6.7	48.3	50.4	A	9.4	52.3	46.0		9.1	56.8	17.4		9.5	57.5	40.0	
9.3	6 32.2	48.2		8.5	51 10.3	53.9	A	9.4	28 34.7	33.0	B	9.2	20 4.9	9.1		9.4	12 10.4	50.6	A
8.8	8 18.8	17.2		7.3	25.4	31.5	G	9.0	30 37.5	11.5	A	9.3	36.9	42.0	B	9.5	14.8	34.2	
9.3	30.9	14.3		9.4	30.8	21.8		9.3	31 47.5	33.7		9.4	50.1	44.2		9.4	55.0	58.7	
9.4	44.7	7.0		9.3	47.9	31.5		9.3	32 8.0	46.4		7.4	24 8.2	41.2	B	9.2	13 29.8	43.8	A
9.0	9 34.3	46.2		8.7	52 13.4	33.5	A	8.5	35 8.0	26.8		9.4	25 31.1	25.6	B	9.1	15 47.3	12.5	
9.3	10 49.8	54.5		9.3	53 15.2	47.3		8.6	36 59.2	56.1	A	7.5	26 26.3	46.3	A	9.3	16 2.0	42.5	
9.5	11 1.7	15.8		7.0	19.3	4.1	A	9.5	37 21.0	57.8		8.8	27 16.8	56.4	A	9.3	43.8	30.2	
9.1	29.7	41.7		9.1	55 6.8	19.3	B	9.5	38 0.1	39.2		7.0	29 56.4	9.1	A	8.2	17 28.8	43.0	A
8.0	12 2.4	21.6	B	8.5	14.5	56.2		9.5	39.5	8.2		9.5	30 5.4	55.7		8.0	18 28.7	24.7	A
8.8	31.8	48.2		9.4	17.8	14.3		8.5	40.6	39.3		9.5	6.2	17.2		9.0	21 8.9	27.2	A
9.3	35.7	38.8		9.4	41.6	22.1		9.1	39 26.0	22.4	B	7.3	40.8	1.6	A	8.3	23 40.8	19.9	A
9.3	50.4	6.5		8.0	45.8	31.1	R	8.3	42 35.8	16.7	B	8.4	31 0.9	34.5		9.2	50.2	25.2	A
9.2	52.8	9.9		9.3	56 8.3	43.3		8.8	43 24.7	50.9	A	9.3	26.7	4.6		6.8	24 38.0	14.4	A
8.7	13 12.9	56.5		8.7	58 11.7	41.5		9.0	45 52.3	46.0	A	8.8	44.4	10.5		9.4	25 41.3	28.7	A
9.4	14 52.7	10.4		8.7	14.4	3.6	A	8.9	47 53.5	39.1	A	9.0	32 18.6	7.9		9.1	26 14.2	42.8	A
9.2	15 2.2	59.4		9.5	32.5	17.2		8.2	48 37.2	57.8		9.4	33 1.8	9.6	B	8.2	24.1	31.2	B
9.2	16 2.8	23.5		9.5	49.1	7.6		8.5	44.5	31.7	A	9.5	32.7	8.4		9.5	27 54.8	41.0	
9.5	39.3	39.3		8.9	59 5.2	11.6	B	9.5	49 17.2	11.5		9.4	48.6	49.1		9.5	29 54.9	51.3	
9.2	17 38.1	22.5	B	8.0	46.4	40.3	A	8.3	20.0	20.0	A	9.0	34 7.9	25.6	B	6.0	30 4.8	24.5	G
9.0	19 45.8	48.7	A	6.7	56.3	58.3	A	9.0	45.0	6.7		9.1	54.7	32.0	B	8.0	32 6.7	23.3	G
9.0	20 30.2	0.1	A	9.1	56.6	10.7		9.5	50 21.1	28.4		7.4	38 37.6	55.9	A	9.2	33 27.8	51.9	A
9.0	21 23.4	1.6	A	9.5	1 10.0	41.8	R	8.3	48.5	5.7	A	8.3	57.0	37.8	L	8.9	34 8.4	41.4	A
9.0	24.4	54.8		9.5	2 33.4	49.7		9.3	52 50.0	28.8		5.0	42 13.6	45.1	A	9.5	57.6	28.9	
8.9	36.1	24.5		9.4	57.5	28.0		5.8	53 22.7	51.2	A	9.4	43 35.7	1.1		9.5	35 1.6	59.9	
9.4	22 6.7	28.5		8.3	5 22.9	31.9	A	9.5	54 34.6	10.7		9.5	42.6	47.6		9.5	14.4	28.5	B
8.3	35.8	39.8		9.5	6 50.0	2.0		9.0	55 11.8	26.3		9.4	59.1	6.9		8.5	37 27.0	33.6	
9.0	23 56.7	38.8		6.5	7 6.2	34.4	L	8.8	43.7	33.6		9.2	44 0.7	1.6		9.1	38 18.5	22.3	
9.5	24 1.0	30.0		9.3	8 14.4	33.9	R	9.0	49.8	52.5		9.3	33.6	16.2		9.4	39 8.3	45.7	B
8.6	12.2	49.2	A	6.9	9 25.4	1.2	A	9.5	57 25.0	32.7		7.0	46 37.3	56.6	A	9.2	43.2	50.6	
9.5	40.2	12.7		9.5	10 14.3	32.4		9.1	58 55.0	59.2		8.7	38.1	44.2	A	9.4	40 18.1	39.4	B
7.9	25 29.6	42.0	B	9.0	11 15.2	52.3	B	9.4	59 15.9	14.8		9.5	48 25.6	55.6		9.5	42 6.8	1.2	
7.2	44.2	9.3	G	9.5	12 30.0	6.0		9.4	19.1	9.1	B	9.3	42.3	41.7	A	8.9	19.8	38.5	A

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	10u—11u	+54°			11u—12u	+54°			12u—13u	+54°			13u	+54°			13u—14u	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	42 44.4	49.2	A	8.0	37 26.5	45.5	A	9.2	15 40.4	10.1	A	8.5	8 25.9	35.1	B	9.1	56 47.6	10.7	B
9.2	43 26.9	54.6	B	9.0	43.0	43.0	A	7.5	16 50.0	57.7	A	8.2	52.8	53.8	A	9.3	57.5	31.1	
9.5	45 26.9	15.8		8.3	50.6	35.2	A	9.1	17 12.4	41.0	A	8.5	9 25.5	17.0	A	9.5	57 30.6	35.1	
8.5	57.1	20.9	F	8.3	39 15.7	5.3	S	9.2	18.9	30.2	A	8.8	10 3.7	0.3	A	9.5	58 54.4	14.5	
8.8	47 57.5	28.2		9.4	41.8	50.5		9.5	24.0	16.0		9.5	12 25.6	47.0		9.5	59 57.2	46.0	
9.5	50 33.6	29.7		9.2	40 17.9	51.8		9.1	20 17.4	53.1	A	9.0	28.1	32.2	A	9.5	0 39.7	54.3	
8.9	51 50.1	0.7	B	9.5	54.7	1.6	B	9.5	45.2	37.9	B	9.2	57.0	21.3		8.7	1 39.6	31.9	B
8.9	52 34.8	39.5		7.9	42 19.0	37.2		9.0	21 28.1	54.5	A	8.5	14 52.5	37.2	A	9.1	2 36.0	44.5	
9.5	54 6.3	31.5		9.5	32.4	56.8		9.5	44.4	51.7		9.1	15 21.0	7.7	A	9.5	42.3	57.1	
9.5	55 23.1	51.2		8.8	43 3.1	18.0		8.8	22 12.0	3.7		9.1	34.3	49.6		8.8	4 27.5	34.7	
9.3	31.6	11.1		9.5	44 23.7	7.2		9.3	23 52.5	40.1		9.0	16 35.5	6.7		9.5	35.4	27.3	
9.5	56 9.8	56.3		9.0	36.9	29.2	A	9.5	25 20.0	12.1		8.4	59.4	28.3	A	8.0	5 32.4	3.7	A
9.2	57 10.2	34.3		8.7	45.5	35.3	A	9.5	27 16.0	21.0		9.2	18 20.5	50.5	A	8.5	7 8.7	54.6	
7.1	21.1	38.0	B	9.0	45 22.0	26.8	A	9.5	19.9	37.2		9.0	19 1.5	49.0	A	9.5	9 27.5	57.3	
8.8	58 5.3	23.1		2.5	46 12.4	29.6	S	9.2	47.4	28.8		8.5	7.7	4.7	A	9.1	34.3	36.2	
8.0	19.0	27.7	L	9.4	27.0	33.5		9.4	29 26.4	1.0		9.5	20 58.0	0.8		9.5	58.0	58.0	
9.5	52.4	52.2		9.2	37.5	11.0	A	9.0	30 49.4	33.3	R	9.5	21 9.0	18.5		9.5	10 4.4	54.0	
9.5	59 15.0	37.5		9.4	47 14.3	15.1	B	9.5	32 10.7	18.3		9.4	17.5	10.6		8.8	56.0	7.7	A
9.2	52.2	35.0	A	9.2	49 31.5	7.4	A	9.3	42.3	21.5		9.5	52.2	8.3		9.5	11 34.5	18.0	
9.0	0 18.1	20.8	A	8.9	56.9	21.9	A	9.5	33 23.6	59.1		9.5	58.1	0.8		9.5	12 36.1	15.3	
8.2	31.9	55.6	A	8.3	50 32.7	59.8	A	9.5	34 15.4	54.4		9.3	22 13.1	9.6	B	8.0	13 41.7	36.3	L
8.5	38.3	27.2	A	8.3	52 20.9	11.9		9.5	35 33.3	21.9		9.4	23 38.5	32.9	B	9.5	15 1.6	59.5	
9.5	1 2.3	15.3		8.8	22.7	0.5		9.3	36 10.5	1.6	B	9.4	24 12.2	17.5		9.5	16 5.6	28.3	
9.5	14.2	41.4		9.0	53 54.4	50.4	A	9.3	53.7	3.8		8.7	25 28.0	4.6	A	9.5	13.0	16.0	
7.1	19.6	53.3	A	9.2	54 29.8	43.5	A	8.9	57.1	54.2	A	9.3	26 15.0	27.3	A	9.5	32.5	43.0	
7.0	3 6.7	56.0	A	9.5	55 39.0	13.6		8.8	37 17.3	36.7	A	7.5	47.2	42.5	A	8.0	36.2	33.5	A
9.4	50.0	42.7	A	9.5	56 47.4	49.9		9.0	38 54.4	11.1	B	9.5	27 34.3	44.5		9.5	17 2.4	56.4	
8.0	4 40.3	10.0	A	7.8	57 17.7	54.1	A	8.0	39 52.7	35.3	A	8.5	52.0	6.7	A	7.5	6.6	10.9	A
9.3	57.6	59.8		8.0	58 22.9	17.5	B	9.3	41 51.3	14.6		8.1	28 22.1	28.6	B	9.5	10.5	6.0	
9.5	6 25.0	8.0		9.5	23.9	51.5		9.0	43 1.2	46.5	A	9.2	53.0	55.9	A	9.5	22.0	32.7	
9.4	7 31.9	51.7		9.0	25.2	43.0		9.1	16.3	41.1	A	9.3	29 3.5	25.8		var	18 1.4	28.3	B
9.5	8 25.8	0.7		8.0	1 44.9	29.8	A	9.5	34.9	27.9		9.3	35 0.8	34.3		9.4	15.0	13.0	
9.5	9 12.3	45.3		7.0	2 0.4	12.5	A	9.4	46 37.4	27.2		9.3	11.5	28.3	B	9.4	25.0	13.2	
9.5	26.6	58.0		9.5	22.8	3.2		8.4	59.1	23.8	B	8.5	25.6	47.5		9.5	46.6	22.1	
9.2	10 44.0	6.1		9.1	53.4	15.5	A	9.5	47 24.8	12.6		9.0	29.0	6.7	A	9.5	19 2.9	55.7	
8.8	11 5.4	27.6		9.5	3 23.0	17.1		6.2	49 56.8	53.2	A	9.0	36 1.0	4.2	A	9.5	19.3	3.0	
9.5	12 57.3	40.0		8.3	41.4	43.7		9.3	50 21.6	29.8		9.0	37 34.7	45.9	A	9.3	27.6	6.9	
9.5	15 54.3	21.9		9.2	4 0.7	41.0		9.2	38.4	53.4		8.6	49.0	28.4	A	6.8	20 23.1	13.8	A
8.8	16 24.5	46.7		7.5	15.4	14.0	A	9.0	52 1.8	14.1	A	8.8	38 35.5	34.6	A	8.5	48.2	22.2	A
9.5	18 0.0	22.6		9.2	24.5	8.5	A	9.5	53 10.3	39.1		8.5	43.3	22.8	A	9.5	22 15.0	37.1	B
9.3	2.2	20.6	B	9.0	6 20.2	2.2	A	9.5	54 0.0	48.0		9.5	39 43.0	1.3		8.5	28.1	34.9	R
9.3	28.8	31.5		9.2	7 1.4	24.8		9.5	55 9.3	35.0		9.0	42 34.0	37.6		8.5	24 15.2	20.1	L
9.5	19 44.0	21.6		9.5	4.4	59.7		9.5	11.2	38.0		9.2	40.4	47.3	B	9.5	18.1	28.0	
9.3	21 7.1	49.5		6.7	32.4	15.0	A	8.5	56 36.3	43.5		9.5	43 55.5	19.9		9.5	59.6	12.3	
8.8	41.4	56.7	A	9.5	50.7	38.7		7.5	58 7.3	43.6	A	8.5	45 26.0	16.7		8.9	25 51.1	5.5	
9.3	25 28.0	10.2		9.0	50.9	8.7	A	7.5	27.9	37.9	A	9.0	54.3	11.0	B	9.0	27 23.1	0.1	
8.3	26 7.5	34.7		9.4	8 6.9	20.5	A	9.5	57.3	19.5		9.5	46 58.8	12.5		9.5	55.3	33.9	
9.5	37.1	51.8		9.0	38.0	39.6		9.4	59 2.3	27.4		8.3	47 31.5	27.3	A	9.0	30 6.5	0.5	A
9.5	46.0	9.2		9.3	10 16.4	13.4	A	9.2	31.1	47.2	A	9.5	43.0	37.1		9.5	14.6	33.9	
7.5	27 29.5	22.8	A	6.1	20.7	0.3	A	8.6	36.2	12.8	A	6.0	48 31.5	26.3	A	9.2	27.1	4.0	A
8.4	40.9	42.0	A	9.1	40.7	0.3	A	9.2	0 1.3	18.9	B	9.5	49 56.9	51.8		9.1	55.6	19.7	
9.2	31 14.1	56.1		9.4	44.5	51.4		9.4	28.4	36.9	B	7.3	51 36.6	36.6	A	9.4	31 46.5	43.3	
9.0	41.5	34.7	A	9.2	12 48.6	21.8	A	8.2	1 55.8	20.1	B	6.8	52 26.3	37.6	A	5.8	33 39.2	38.8	A
9.5	33 44.3	57.4	B	8.5	13 6.9	23.8	A	9.4	2 8.3	20.9		9.3	31.2	13.0		8.8	34 1.7	41.8	[illegible]
9.0	34 34.6	25.9		8.3	8.8	42.5	A	8.7	4 1.1	23.8	A	9.1	53 1.0	11.5	A	7.3	45.6	3.5	
9.2	42.0	7.2		9.3	13.1	5.2	B	9.4	35.3	20.4		7.7	18.7	17.0	A	9.4	36 8.5	54.7	
9.3	36 1.4	45.0		8.3	55.8	8.5	A	9.3	5 6.2	29.7		9.0	54 4.0	50.3		9.5	28.1	47	
9.5	21.0	19.6		9.1	14 30.4	39.2	A	9.3	6 17.3	9.6		9.5	40.0	39.1		9.5	44.6	[illegible]	
8.0	49.6	28.4	A	9.5	15 8.6	25.9		9.5	29.8	28.3		9.5	55 11.8	7.7		9.3	37 18.2	[illegible]	
9.2	37 16.0	51.0	A	9.2	28.5	8.2		9.2	8 2.6	26.3		8.7	20.0	27.3	A	7.0	38 49.3	[illegible]	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	14ᵘ—15ᵘ	+54°			15ᵘ—16ᵘ	+54°			16ᵘ—17ᵘ	+54°			17ᵘ—18ᵘ	+54°			18ᵘ	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	39 48.0	56.9	A	9.3	36 47.2	0.5		9.0	31 13.0	15.7	A	8.4	24 52.3	27.9	A	9.5	2 40.5	21.6	
9.3	41 23.9	55.7		9.2	37 12.0	0.7		9.1	43.9	47.3	A	9.5	25 7.0	31.9		9.3	4 12.4	28.6	R
9.3	52.6	19.1		9.3	47.4	19.0		9.0	33 50.2	54.1		9.4	26 30.8	57.0		9.0	23.1	6.4	
9.0	43 13.2	19.1		9.5	38 10.5	12.6		9.2	51.7	50.6		9.0	33.0	45.9	A	9.3	26.9	34.2	B
9.5	44.4	25.5		9.4	56.5	36.2		9.3	34 29.9	22.2		9.3	56.3	44.3		9.5	40.7	28.8	
8.8	44 31.1	6.8		9.5	40 58.2	17.5		9.0	50.0	7.6	B	9.5	27 19.8	42.9		9.0	59.8	9.0	R
9.5	37.3	15.8		9.0	42 6.1	19.0		8.0	36 30.9	41.4	A	9.3	38.0	20.0		9.4	5 15.1	46.8	
7.3	43.4	49.2	F	9.5	10.9	58.8		8.5	38 4.3	42.6	B	9.5	28 24.8	4.6		9.2	26.8	38.7	
9.0	46 8.6	32.0		8.8	43 10.8	4.3		9.0	20.4	32.0		7.5	29.7	27.9	A	9.5	7 30.8	35.0	
8.3	47 13.5	20.7		9.5	55.4	9.7		9.0	39 15.6	44.4	A	8.3	52.0	27.9	A	6.0	33.9	14.6	A
9.5	23.1	46.6		9.2	44 57.9	6.5	A	9.5	41 43.2	29.5	B	9.3	29 17.8	4.3		8.0	48.7	31.2	A
9.5	48 31.5	7.2	B	9.2	45 4.5	50.0		8.8	46.1	28.0	B	9.5	36.1	41.7		9.5	8 47.9	12.0	
9.0	49 9.2	36.8		9.3	17.8	10.3		9.5	42 50.3	18.4		9.2	44.8	19.9	A	9.5	9 5.0	41.5	
8.7	22.1	14.7	A	9.4	20.9	47.0		8.4	43 25.9	39.9	A	9.4	31 56.7	50.8		9.4	37.6	44.2	
9.3	51 3.4	2.8	B	9.4	47.0	27.8		9.3	28.3	57.4		9.4	32 26.3	23.0		9.4	43.3	30.4	A
7.7	4.0	14.9	B	9.4	47 51.4	26.5		9.5	37.5	21.7		9.5	32.9	35.9		9.1	49.4	43.9	A
9.3	17.5	10.6	A	9.3	48 9.4	27.3		9.1	44 46.9	26.3	B	9.3	33.8	26.5		9.5	10 39.0	59.3	
9.4	30.7	7.7		8.3	49 22.3	18.6		8.5	45 51.4	16.5		9.3	33 14.5	30.9		9.5	11 7.1	45.1	
9.2	52 41.9	5.7	A	9.5	50 41.7	2.7		9.5	46 23.5	47.8		9.5	25.0	31.1		9.3	18.4	9.0	
8.3	53 24.9	14.4	A	8.0	51 46.5	27.1	L	9.3	47 14.8	56.4		9.0	35 45.6	10.2		6.6	12 19.3	6.1	R
9.2	30.5	38.5		9.0	52 9.7	30.0		8.5	48 4.2	1.6	A	9.0	36 58.5	27.9		8.8	31.0	30.9	
9.4	45.4	35.1		8.8	25.2	35.0		9.3	10.7	13.1	A	9.3	37 15.0	15.5		9.4	58.6	26.1	
9.1	54 55.3	54.2		9.3	53 5.8	0.7		8.5	16.6	16.9	A	9.4	46.9	51.2		9.4	13 7.2	4.8	
7.5	55 15.5	25.6	A	9.5	56.0	18.2		7.0	45.6	35.1	L	9.5	39 11.2	40.8		9.4	14 0.0	34.1	
7.5	16.6	27.1	A	9.5	54 42.7	31.9		9.3	50.1	32.6		9.5	40 28.5	17.4		8.8	8.9	42.3	
9.5	56 52.9	44.1		8.7	44.4	54.2	A	8.0	49 27.7	49.2	B	9.0	42 42.5	37.9		9.4	32.6	9.8	
9.5	57 13.0	5.4		7.0	56 51.3	21.3	A	8.7	47.0	59.2	A	8.8	43 10.8	0.6		9.0	15 0.6	14.3	A
9.1	35.1	10.3	B	7.7	53.6	56.4	A	9.4	58.7	19.9	A	9.0	39.3	16.5		9.0	16.5	17.9	A
9.5	0 57.4	39.2		9.5	57 50.5	49.8		8.8	52 7.6	39.5	A	9.0	54.0	14.0		9.5	27.0	45.1	
8.9	1 41.7	16.5		9.4	58 31.9	4.6		9.0	41.1	44.5	A	9.0	45 15.6	19.4	B	8.3	46.9	32.4	F
9.5	3 42.6	44.9		8.7	1 5.3	47.3	A	9.3	54 15.2	6.6		6.5	46 5.2	14.0	L	9.4	16 13.0	32.6	
9.2	4 37.0	26.8		9.3	37.9	48.8	A	8.8	55 52.0	57.2		9.2	30.9	36.9		8.5	35.0	33.9	A
9.1	7 29.9	5.8	B	9.5	3 16.8	40.5		9.4	56 6.2	1.6		9.0	56.8	42.8	B	8.2	17 5.1	29.8	A
8.8	8 0.4	24.9	A	9.1	27.8	45.4		9.4	57 34.6	8.0		9.4	47 0.4	24.1		8.7	19.0	24.0	A
8.4	29.9	33.8	A	9.5	4 6.9	38.5		9.2	58 21.7	52.0		8.8	11.4	40.6	B	8.5	18 49.9	56.8	F
9.5	9 50.9	25.9	B	9.2	8.3	45.8	A	8.2	42.7	48.3	B	9.4	19.6	28.8	B	9.1	50.7	8.6	
9.1	10 38.7	57.5		9.2	49.3	55.1	A	4.8	2 20.5	39.6	S	8.8	25.0	46.8		8.7	19 32.6	44.2	
8.5	11 24.0	17.6		9.3	5 41.4	53.8		8.9	38.2	33.6		9.4	26.2	16.7		8.1	20 7.2	1.3	A
9.2	14 39.8	5.8	A	9.5	6 56.0	51.5		9.3	4 36.6	6.5		9.4	48 13.9	5.7		7.1	12.8	20.7	A
9.5	15 52.0	37.3		8.8	7 34.8	42.3	A	8.5	5 29.7	26.3		9.5	49 19.8	34.4		8.2	17.9	12.8	A
9.3	16 15.0	6.4		9.5	8 5.5	1.7		8.6	7 8.6	41.0	A	9.2	22.2	8.5		9.5	40.0	0.1	
7.3	17 2.8	27.0	B	9.5	9 47.3	3.6		9.0	11.1	40.4	A	9.5	32.9	6.8		9.5	42.0	43.1	
9.0	18 31.9	29.9		9.0	12 25.7	47.3	A	9.0	13.0	13.7	B	9.5	50 46.7	25.9		9.3	21 0.4	39.4	A
9.0	19 48.4	12.3	A	9.5	48.8	10.0		9.3	22.1	13.9	B	8.6	53 25.5	5.0		9.5	8.0	37.6	
6.5	20 38.5	44.1	A	9.5	53.3	35.5		9.3	8 2.6	39.5		7.5	54 39.5	41.4	L	9.5	17.6	28.0	
9.5	21 19.8	4.9		9.5	16 6.9	40.5		9.5	35.7	50.0		9.2	55 9.6	6.8		9.5	37.9	16.5	
6.5	22 35.4	30.9	A	9.0	14.9	8.1		9.3	9 45.8	54.7		9.5	21.8	23.0		9.2	22 1.0	47.4	A
9.0	24 28.0	48.0		9.5	17 5.6	24.9	B	8.9	53.6	18.8	A	9.5	56 24.2	17.8		8.8	31.1	36.7	A
9.0	25 35.4	38.7		7.7	30.9	44.8	L	7.0	10 2.6	18.8	A	9.5	54.1	16.0		9.5	45.0	6.7	
8.5	26 35.6	28.8		8.9	18 28.4	22.7		9.1	58.8	23.3	A	9.5	57 6.1	16.0		9.5	23 3.2	27.5	
9.0	37.0	19.6		8.5	41.6	52.4		8.8	13 29.1	42.5	A	9.0	52.6	52.8	B	9.5	19.0	3.1	R
8.6	28 1.7	59.4	G	9.5	22 34.5	59.0		9.3	59.8	59.6		8.9	57.2	17.2	A	9.5	28.2	51.8	
9.2	34.0	19.0		9.0	24 21.8	34.0	A	9.5	15 46.1	42.1		9.3	59 4.9	13.2	A	7.2	24 6.9	47.8	A
9.1	38.4	24.0		8.5	31.6	51.2	A	9.4	18 31.2	57.1		9.3	0 54.3	8.9		9.4	7.0	44.1	
9.2	30 18.5	22.0		8.8	33.7	32.5	A	9.4	19 5.4	0.4		8.9	1 5.1	42.3	R	9.2	12.8	2.4	
6.0	31 25.4	24.9	G	9.5	25 56.5	59.9		8.6	20 57.5	29.8	B	9.4	23.1	9.2		9.5	30.2	36.4	
9.0	32 24.9	21.7	B	9.0	29 12.4	38.0	A	9.0	22 36.3	42.3	A	9.5	56.7	33.8		9.5	54.8	31.7	
6.0	33 48.7	59.7	A	8.9	19.9	57.4	A	9.5	47.1	35.9		8.6	2 4.0	5.1		9.2	25 9.7	57.2	A
9.5	34 13.5	4.8		8.5	30 34.8	12.9	A	9.2	23 7.6	56.1		9.5	29.6	38.8		9.5	41.5	58.7	
9.5	36 23.4	38.2		9.5	31 8.5	57.0		9.4	24 18.1	56.6		8.3	37.4	30.0	A	9.5	47.5	59.0	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	18ᵘ	+54°			18ᵘ—19ᵘ	+54°			19ᵘ	+54°			19ᵘ	+54°			19ᵘ—20ᵘ	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	26 20.3	6.1		9.5	53 35.8	51.6		9.1	15 55.7	53.0		9.5	31 18.0	58.7		9.4	49 30.0	1.0	
9.5	27 8.9	26.1		9.0	54.5	18.3		9.5	16 13.3	5.8		9.5	38.9	51.1		9.5	46.3	44.7	
9.3	11.9	20.9		8.8	54 29.6	41.2		6.4	24.1	6.7	G	9.5	32 15.8	57.2		9.3	50 19.0	18.0	B
9.4	17.7	36.8	A	9.4	38.1	29.7		9.5	42.5	24.3		9.4	57.5	6.5		9.5	29.3	22.0	
9.5	28.0	18.9		9.2	58.0	53.3		9.3	17 19.9	32.3	B	7.7	33 20.5	41.1	B	9.2	33.4	17.4	
9.3	28 38.0	13.0		9.2	55 17.8	21.5		9.5	23.3	44.5		9.5	34 15.5	24.1		8.8	37.2	16.8	A
9.0	42.3	41.4		8.0	41.7	41.7	F	9.4	26.2	18.7		7.5	17.9	37.5	A	9.0	51 42.4	23.9	A
9.5	44.8	32.7		9.5	46.3	59.6		8.5	47.8	0.9		9.4	31.0	17.3		9.5	54.0	56.7	
9.5	29 4.3	58.3		9.5	51.0	53.0		9.5	18 15.0	58.0		9.1	42.9	17.8	B	9.5	52 20.7	3.5	
9.2	30 7.5	28.7		8.2	56 19.5	38.7	F	9.5	15.5	23.3		9.0	35 13.5	20.1		9.5	21.5	7.8	
8.3	9.8	52.6		9.5	23.5	24.5		9.4	43.4	35.2		9.1	19.5	59.5		9.5	22.0	48.5	
9.4	31 6.8	29.7		9.3	50.4	17.5		9.5	55.9	42.5		9.1	26.9	53.1	B	9.5	42.3	3.9	
7.8	59.5	5.8	F	8.0	57 1.6	26.8	A	9.1	58.7	45.1		5.8	27.0	37.8	A	7.5	47.1	38.0	A
9.5	32 31.4	20.3		8.8	10.1	57.3		9.3	19 47.8	50.4		9.3	27.8	55.6		8.0	53 30.5	37.5	G
8.7	58.5	43.7		9.1	58 14.2	29.7		7.5	51.6	47.4	A	9.5	37.5	31.0		8.3	31.8	24.4	
9.2	33 8.1	19.0		9.4	46.0	26.5		8.8	20 19.4	26.9		9.5	36 15.4	14.2		9.5	48.3	25.2	
9.5	22.4	12.7		9.4	59 16.4	51.6		9.5	48.5	20.2		8.7	47.8	56.0		9.4	54.5	0.5	B
8.5	24.3	49.5		9.0	25.5	27.8		9.5	21 24.2	54.8		9.0	50.7	49.7		9.5	54 12.0	58.8	
9.5	33.3	15.9		9.4	43.4	21.8		9.0	35.7	6.1	A	9.5	37 5.2	9.5		8.8	13.7	14.2	R
7.8	57.2	42.2	A	7.5	0 48.8	9.7	G	8.5	37.3	8.8	A	9.5	7.8	14.0		8.4	27.7	46.2	A
9.5	34 53.1	47.6		9.3	1 22.8	46.6	B	9.4	45.0	12.5		9.4	34.5	2.6		9.2	33.5	52.0	
9.5	35 1.0	33.7		9.4	29.3	47.0		8.5	22 2.6	15.7	A	9.1	38.6	47.9	B	8.5	55 15.6	46.4	A
9.2	37 37.5	11.0	A	9.2	2 36.7	37.1		9.2	22.6	17.3		9.4	55.1	10.6		9.4	43.7	24.9	
8.0	38 6.3	47.3	B	9.2	41.6	31.7		9.5	25.7	4.6		9.5	56.6	29.9		9.3	56 19.4	51.4	
9.3	39.5	55.1		9.4	59.5	15.4		9.3	28.5	59.0		9.5	38 13.6	46.9	B	9.4	23.7	48.0	
9.5	48.6	20.8		9.4	3 27.5	36.8		7.3	53.6	35.6	A	9.4	39.3	41.2		9.5	29.0	3.5	
9.2	39 43.4	32.7	A	8.5	58.4	9.6		9.1	23 1.2	37.8		9.5	44.5	39.5		8.1	54.4	47.8	A
9.3	44.1	52.6		8.9	5 17.3	36.5		9.4	36.1	53.0		9.5	53.0	10.0		9.5	56.5	49.6	
9.1	46.5	48.2		7.8	51.8	51.8	A	8.9	39.9	59.3	A	9.4	39 0.7	59.0		8.8	57 0.9	40.7	J
9.0	49.8	43.2		9.4	6 40.7	23.3		9.5	54.2	7.7		9.4	23.1	48.0		8.5	4.6	10.5	
9.3	54.4	34.7		9.5	54.0	2.0		9.5	24 0.7	15.1		9.4	26.4	5.4		9.3	12.3	0.1	
9.2	41 44.1	22.5		9.1	7 2.0	24.8		7.3	57.8	28.9	A	8.4	32.6	40.7		9.5	21.0	2.8	
9.0	46.5	51.1	A	8.7	8.8	36.9		9.5	25 9.5	3.6		9.5	53.0	32.9		9.0	59.5	38.9	
6.0	59.2	44.2	A	9.5	15.9	39.1		9.4	11.9	25.7		9.5	40 40.7	49.0		9.1	58 10.5	32.5	
9.1	42 52.9	11.6		8.3	29.1	13.9		9.3	42.5	5.1		9.5	45.9	16.4		9.4	22.2	9.3	
9.3	43 25.6	8.2	A	8.9	32.9	20.1	R	9.1	42.7	10.0	B	9.5	41 33.0	35.4		8.2	36.5	14.3	A
9.3	36.8	8.4	A	9.5	8 0.2	50.2		9.4	54.0	51.2		9.3	46.6	19.6		8.2	51.8	16.1	A
9.5	44 15.0	23.1		9.4	1.5	51.2	B	9.4	58.1	0.8		8.6	58.8	40.5		8.8	58.5	13.9	A
9.5	46 17.2	6.3		9.5	7.8	2.0		8.5	58.5	30.6	A	9.5	42 10.0	34.5		9.5	59 8.5	2.2	
9.5	29.0	55.6		8.5	8.6	57.9	A	9.3	26 0.0	53.1	B	9.5	19.7	34.5		9.4	54.5	51.1	
8.7	33.3	18.2	A	9.5	47.0	21.0		9.5	33.4	32.5		9.2	54.3	12.5		7.9	0 32.2	3.7	A
7.5	47 18.9	8.7	A	9.4	9 18.5	23.5		9.5	27 13.2	30.7		8.3	57.6	16.9	A	9.2	40.8	4.5	
9.5	25.1	1.7		8.6	50.6	55.6	A	9.0	28.0	7.8		6.5	43 0.7	2.9	A	9.2	1 1.3	25.5	
9.4	48 13.5	17.3		9.1	58.6	51.9	A	9.0	29.2	30.8		8.8	17.4	1.4	A	9.0	2 2.4	33.9	
9.3	23.0	59.0		8.9	10 5.2	51.7	A	9.3	46.5	59.0		8.4	57.3	50.2	A	9.3	3 9.5	42.9	
8.6	28.8	56.0		9.5	5.8	14.0		9.0	49.9	45.7		9.5	44 9.9	54.4		8.0	21.2	13.7	A
8.2	53.2	43.7		9.2	40.3	47.7	A	9.5	51.7	56.0		9.5	45 39.5	13.9		9.5	29.0	5.7	
8.7	49 10.6	9.4	F	9.4	41.5	52.7		9.0	28 18.5	9.5		9.5	45.1	8.6		9.1	48.2	40.8	
9.4	23.4	25.3		8.8	11 59.5	17.9		6.6	18.5	56.7	A	8.5	46 12.6	40.0		8.5	4 3.0	53.9	A
8.5	54.8	42.5	B	7.7	12 9.0	54.7	A	9.3	22.7	0.0		9.5	17.2	31.9		9.5	13.8	38.0	
8.5	50 4.8	42.6	B	9.5	15.8	9.3		9.5	36.8	21.6		9.4	26.0	22.9		9.4	14.3	3[illegible]	
9.3	7.5	38.2		8.2	16.9	19.4	A	8.9	29 10.6	10.6		7.8	43.1	17.0	S	9.2	47.5	[illegible]	
8.7	19.1	45.3		7.5	47.0	42.2	A	9.0	18.5	14.4	B	9.4	47 28.7	48.6	B	9.4	54.[illegible]		
9.5	51 1.5	5.6		9.5	48.5	49.3	B	9.5	30.0	16.7		9.4	42.6	59.5		8.3	5 35.[illegible]		
8.8	33.8	54.1	R	9.4	13 23.4	32.5		8.9	40.7	13.0		8.9	47.5	38.0	A	9.2	5[illegible]		
9.2	52 25.8	29.7	R	9.5	48.7	0.3		9.4	30 7.2	59.7		9.5	57.4	36.5		9.4	6 [illegible]		
9.3	37.2	13.0	B	9.4	58.4	57.8		9.5	20.8	13.8		9.2	48 15.0	46.0		9.2			
9.0	55.7	2.8		8.0	14 6.4	2.0	B	9.5	44.9	25.8		9.4	28.1	46.8		9.3			
9.3	57.8	26.0	B	9.5	29.5	43.9		8.8	57.0	7.5		9.3	29.9	43.0		8.3			
9.0	53 4.1	30.7	R	9.5	55.4	38.1		9.3	31 1.7	43.9		9.5	49 14.5	15.8		8.8			

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	20ᵘ	+54°			20ᵘ	+54°			20ᵘ—21ᵘ	+54°			21ᵘ	+54°			21ᵘ	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	6 58.9	49.0		9.2	25 57.5	36.5		9.0	43 48.5	36.2		9.1	3 32.0	43.7		9.3	23 35.5	14.8	
8.9	7 2.0	3.8		7.3	26 26.8	11.4	A	9.3	51.4	52.1		9.5	4 6.4	45.0		9.5	44.4	10.4	
8.8	37.5	0.5		8.5	35.9	29.8	A	9.5	44 8.0	13.3		9.5	16.9	41.1		9.3	47.1	25.7	
9.5	8 9.7	41.8		8.6	43.8	6.2	A	9.5	15.2	27.9		9.0	5 13.5	43.0	A	6.1	24 19.8	47.2	G
9.0	48.2	18.2		9.3	48.9	9.9	B	9.1	46 4.4	19.3	A	8.5	16.3	26.7	A	9.5	25 2.5	7.9	
9.1	9 0.4	42.5	G	9.5	27 5.1	8.8		7.2	40.9	28.8	A	9.5	29.3	8.1		9.5	18.4	50.1	
9.5	11.7	46.2		9.5	7.6	36.0		9.5	53.1	55.4		9.5	6 0.7	36.4		7.9	19.3	1.0	B
8.5	32.4	57.6		8.1	13.2	6.1	A	9.4	47 5.7	28.0	A	8.3	40.1	40.7	A	9.5	29.4	50.1	
9.5	33.3	31.4		8.9	25.5	50.1	A	7.4	10.4	56.8	A	7.3	46.2	44.4	A	9.5	38.0	56.5	
8.2	35.2	44.0	G	9.5	35.6	2.3		8.8	24.3	37.8		9.0	7 54.8	44.6	A	9.5	38.0	58.7	
7.0	53.5	41.3	G	9.5	42.3	50.3		8.4	48 5.9	16.9	A	8.3	8 2.4	6.1	A	9.5	39.6	51.9	
9.4	56.6	43.8		9.5	45.9	38.1		8.5	15.8	5.5	A	9.5	7.5	25.7		9.5	45.4	46.0	
8.8	10 32.8	18.3	A	9.5	28 26.5	48.0		6.8	17.1	30.2	A	9.5	27.7	57.4	B	9.5	55.8	4.9	
8.4	55.7	4.6	A	7.0	29 31.8	17.8	A	9.3	28.5	20.2		9.3	32.1	51.0		9.5	56.9	40.3	
9.3	11 38.4	12.7	A	9.0	51.7	3.1	A	9.5	46.7	16.3		8.3	45.2	48.5	A	7.7	26 13.5	46.2	F
8.9	44.0	45.9		9.5	59.5	35.8		9.5	49 9.3	35.6		9.2	48.7	43.4		9.5	15.3	36.0	
8.9	50.2	48.4		9.5	30 29.6	10.8		9.5	15.3	54.4		9.5	9 43.7	36.5		9.4	21.8	42.7	
9.1	12 6.6	13.5	A	9.4	32.8	5.2	A	9.0	26.2	55.0	B	7.0	58.6	4.0	A	9.4	36.4	20.4	
9.4	31.2	39.7		9.2	48.1	45.6	A	8.6	36.4	17.7	A	7.8	10 50.4	54.7	A	8.7	52.2	22.3	B
9.2	35.6	40.5	B	9.2	55.4	59.0		8.9	45.1	0.1		9.4	11 13.0	7.8		9.5	27 6.7	25.7	
9.2	48.0	1.0	A	9.2	31 16.5	49.2		8.1	50 32.1	2.8	A	9.4	53.8	24.0		9.5	10.2	24.0	
9.5	13 2.1	23.5		9.0	49.6	5.2	A	8.5	51 23.6	22.8	A	9.2	12 6.3	46.8	A	9.5	25.6	36.1	
9.5	8.2	2.6		9.2	51.0	52.8		9.2	25.8	9.3		8.3	16.1	14.7		9.5	37.3	41.5	
8.8	17.8	13.8	A	9.5	33 25.9	7.9		9.5	36.5	2.5		9.3	18.8	26.5		9.5	49.0	50.9	
8.9	37.8	5.7	A	9.5	57.1	18.5		9.5	44.2	2.9		8.6	32.3	28.9	A	8.5	28 0.1	20.5	
9.3	43.0	25.8		9.2	34 10.1	26.3	A	9.5	52 24.2	30.5		9.1	37.4	11.7		8.9	3.8	3.1	
9.5	14 15.2	41.7		9.2	23.4	42.6	B	9.4	40.9	51.8		9.5	40.5	47.0		8.2	22.0	45.4	A
8.9	24.1	4.9	A	9.4	31.4	47.2		9.5	43.0	37.5		7.8	50.9	27.2	A	9.4	32.9	22.5	
6.0	50.3	56.6	S	9.4	46.2	2.5		9.5	48.8	48.7		9.5	13 8.0	57.2		9.5	34.9	32.7	
9.2	15 7.9	28.8		9.4	35 25.3	51.9		9.5	53 20.0	37.2		7.7	38.0	39.8	A	9.3	56.2	15.6	
9.4	52.5	51.0		8.4	29.3	52.9	A	9.0	23.1	58.0		9.5	52.9	39.3		9.5	29 23.5	22.6	A
9.4	59.0	48.1		9.4	32.7	18.1		6.8	43.6	55.6	A	8.4	14 3.4	28.5	A	9.5	28.5	57.9	
9.4	16 26.5	26.8		8.4	36 4.9	44.3	A	9.0	54.4	39.3		9.5	34.0	35.2		8.5	39.1	32.0	A
9.5	17 3.5	27.8		9.0	6.3	25.5	B	9.5	54 59.0	45.3		9.2	39.8	42.7		9.5	43.0	42.8	
8.4	59.1	54.8	G	9.5	32.1	24.3		9.0	55 37.6	57.7		9.3	15 7.1	8.1		8.5	53.4	26.7	A
9.0	59.5	45.7		7.5	39.0	35.6	A	6.4	41.0	38.9	A	9.0	9.8	18.2	A	8.3	30 9.7	2.3	A
9.5	18 17.2	45.7		8.1	44.6	9.3	B	9.1	43.2	58.4		7.2	18.1	50.3	A	9.5	28.3	48.3	
9.1	20.6	0.7	A	9.2	57.5	53.9	A	9.5	56 15.7	20.7		9.4	18.2	56.1		9.5	47.4	52.3	
7.3	49.2	28.0	G	9.5	37 0.3	48.7		9.1	19.2	26.5		9.4	16 10.8	18.3		9.1	31 1.8	24.2	B
8.8	51.1	15.5		9.5	12.4	33.0		9.0	27.8	32.4	A	9.0	27.4	54.3		9.5	3.3	1.5	
6.7	19 16.1	12.4	G	9.0	18.7	20.7	B	9.4	31.9	44.9		9.1	29.1	47.6	B	7.8	50.5	10.4	A
9.3	20 2.0	32.9		9.5	27.6	22.8		8.8	55.8	32.3	A	9.5	17 7.8	6.2		8.7	32 11.4	56.0	
9.3	36.4	54.9		9.4	35.0	41.1		9.4	57 53.0	19.3		9.1	14.9	48.4	A	7.5	23.0	28.1	A
6.9	59.7	58.4	A	9.5	38 9.7	4.6		9.5	58 21.7	8.5		9.4	28.3	17.0		9.5	47.4	59.3	
9.0	59.8	52.1	B	8.9	39 4.2	2.0	A	9.2	53.1	44.6		9.0	43.7	15.7	A	8.5	33 7.1	22.0	A
7.3	21 2.0	32.3	B	9.5	12.0	2.3	B	9.4	59 4.9	19.5		9.2	59.5	25.9		8.2	34 4.1	4.6	B
8.0	36.8	57.2	A	9.5	27.5	2.0		9.4	29.6	30.5		7.8	18 38.2	39.9	A	8.8	13.9	25.2	
7.3	46.9	12.6	G	6.7	34.4	46.2	A	9.5	36.0	10.0		9.4	43.7	20.9		9.5	20.2	47.3	
7.9	58.2	39.9	B	8.9	47.3	6.4	A	9.1	40.0	23.3		9.4	19 7.6	24.7		9.5	53.3	26.0	
9.0	22 12.7	27.8		9.5	40 23.3	25.7		6.9	42.8	39.5	A	7.0	11.8	40.2	A	7.5	56.6	42.7	B
9.4	30.6	31.5		9.0	41 9.2	55.0		9.5	0 13.0	32.8		9.5	26.0	17.4		9.1	35 5.1	7.3	
9.5	34.0	55.8		9.5	44.5	42.6		9.5	36.4	44.3		8.7	53.5	59.1	A	9.5	8.5	48.4	
9.4	23 17.0	20.6		8.5	58.9	45.4		9.5	1 53.7	25.9		7.3	20 1.3	44.7	A	8.8	15.2	30.0	
9.5	58.4	17.7		9.2	42 7.3	53.1		9.5	2 2.0	48.3		9.5	26.5	40.0		9.3	29.8	47.3	
9.3	24 7.2	44.4		9.0	34.5	22.7	A	9.5	31.5	48.4		9.5	30.4	58.3		6.0	56.0	13.2	G
8.0	33.7	0.9	A	8.8	36.4	20.6	A	7.8	3 0.6	25.0	A	7.8	38.4	43.5	A	9.4	36 0.9	26.6	
9.2	34.2	1.2		9.0	40.7	16.0	A	9.0	3.7	14.9	A	9.3	21 56.5	29.7		7.5	4.3	41.9	B
9.5	53.5	18.5		9.1	43 6.1	51.1		9.5	21.8	34.0		8.1	22 36.3	58.0	A	8.5	7.4	24.8	
9.5	55.4	9.7		9.5	32.4	55.2		9.5	25.2	56.3		9.5	38.6	52.3		9.5	45.0	6.7	
9.5	25 21.0	27.0		9.3	45.0	45.4		9.5	30.1	25.6		9.5	57.8	10.5		9.5	57.4	41.0	

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	21ᵘ	+54°			21ᵘ—22ᵘ	+54°			22ᵘ	+54°			22ᵘ	+54°			22ᵘ	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	37 2.9	29.1		7.8	54 58.3	19.6	G	9.1	9 52.4	46.1		9.4	22 4.7	6.0		9.5	36 48.4	51.9	
9.5	15.2	59.9		9.1	59.0	26.1		8.2	10 36.0	6.6	A	9.4	8.7	59.9		9.5	37 41.6	5.9	
9.1	19.8	10.1		9.5	55 2.6	3.8		8.8	37.5	25.9		9.5	24.2	45.7		8.7	48.5	35.1	
9.4	34.0	50.8		9.4	8.2	55.8	R	9.2	38.0	39.6		9.5	31.3	33.3		9.2	50.6	6.5	
9.5	57.3	40.2		9.1	12.9	53.3	R	9.5	53.1	4.0		9.5	49.4	57.9		9.5	56.3	59.0	
7.7	38 8.0	51.7	B	9.5	26.0	32.1		9.1	11 23.1	45.4		9.2	23 23.7	5.4	B	8.5	38 17.5	49.6	
8.1	10.4	32.6	B	9.3	37.8	13.3		8.8	37.8	5.8	A	9.4	32.6	6.8		9.5	27.9	58.9	
9.4	35.4	46.8		9.0	56 7.0	41.0		9.5	46.5	18.0		9.0	47.2	21.5		9.3	51.3	27.2	
9.0	39 5.5	59.9		9.5	12.8	27.3		9.5	12 12.4	1.7		9.5	24 18.0	39.6		9.0	39 14.4	12.4	
9.2	19.6	55.7		9.4	21.9	5.6		9.5	24.0	54.6		9.3	26.4	2.7		9.3	15.9	41.0	
8.9	23.9	32.7	A	9.1	26.1	37.4		9.3	38.8	18.1		9.4	29.9	14.3		8.9	32.3	10.7	
7.7	32.9	42.9	A	9.1	57 5.9	1.0		8.8	41.7	33.2	G	9.5	31.4	17.2		9.0	40 2.8	6.0	A
9.5	40 18.0	10.4		9.2	13.8	9.2		9.5	55.3	53.1		8.8	25 1.7	9.2		9.5	8.3	46.5	B
9.5	28.8	8.4		9.1	16.2	12.7		9.3	13 5.0	42.1		9.0	56.8	29.7		8.8	9.8	24.0	
9.5	59.8	23.7		9.1	28.4	15.5		9.5	17.6	33.0	R	9.0	26 16.1	42.1		9.1	27.6	13.5	
9.4	41 8.0	51.8	B	9.4	58 5.8	23.6		9.5	54.5	25.0		8.2	37.5	27.1	A	7.1	34.3	6.6	G
9.5	16.5	54.7		7.2	10.3	10.8	A	9.5	14 29.1	39.9		9.5	27 15.5	32.7		9.4	38.0	0.3	
9.5	27.6	25.2		9.4	33.8	0.6		9.5	38.6	52.6		8.4	25.1	20.9	A	8.9	38.2	9.5	
9.4	31.1	54.3		9.4	59 37.9	2.5		9.4	49.2	5.8		9.4	30.3	6.0		9.1	39.7	13.9	
9.5	38.5	56.7		9.1	47.6	22.9	R	8.3	15 1.9	57.4	A	8.8	32.4	1.1	A	9.3	40.6	12.0	
9.5	46.8	3.4		9.4	0 1.3	12.5		8.0	3.3	7.5	F	9.5	32.7	7.2		9.4	43.5	14.8	
9.2	51.9	43.4		9.4	1 3.1	1.7		8.5	11.2	33.7	G	9.2	33.2	12.0	B	9.2	41 48.6	1.0	
9.0	57.8	39.7		8.0	6.2	32.8	A	9.4	15.9	48.6		9.5	45.6	20.7		9.5	48.6	23.8	
8.8	59.0	22.8	A	9.5	15.8	20.5		9.3	40.2	45.7		9.4	46.1	11.1		9.0	42 25.2	11.3	
8.8	42 8.7	12.0	A	9.5	28.0	46.4		9.2	43.6	49.4	B	9.4	47.9	17.5		8.5	44.7	21.7	
8.9	14.5	22.9	A	9.5	29.1	39.3		8.8	53.5	30.5		9.4	54.3	25.0		9.5	58.0	52.2	
9.3	26.3	0.8		9.4	2 7.6	1.0		9.2	16 2.3	52.4		9.5	28 22.8	44.4		8.0	43 48.9	3.5	G
8.9	30.7	27.8	A	8.9	47.2	14.3	A	9.2	10.1	22.5		9.4	43.5	35.4		9.5	44 28.1	16.8	
9.5	39.4	39.9		9.5	48.4	10.7		9.1	11.0	55.6	A	9.5	56.4	59.7		9.5	41.4	12.0	
9.5	54.3	27.2		9.5	3 0.8	49.8	R	8.5	36.2	51.6	A	9.5	29 14.1	21.1		9.3	44.0	49.1	
8.8	45 32.4	3.0		9.5	15.9	12.7		8.7	44.2	4.3		9.4	27.5	16.6		9.2	45 2.0	59.4	
9.0	41.7	33.5		9.3	28.2	30.0		9.4	17 14.1	26.2		9.5	28.4	1.4		9.5	25.9	1.6	
8.4	44.8	15.6		9.5	4 42.8	12.2		9.5	25.7	52.5		9.5	30 11.0	2.6		8.6	46 0.4	43.6	
8.6	49.9	43.9		9.5	49.5	13.5		9.5	28.9	22.7		9.5	17.5	46.7		8.4	23.0	54.7	
9.4	46 52.5	52.9	B	9.5	5 3.0	26.7		9.2	29.2	49.6	A	9.2	19.9	17.8	A	8.9	26.8	38.8	
8.9	56.7	34.5		9.5	29.0	15.6		8.3	33.0	29.8	A	9.0	21.9	18.3	A	9.3	38.9	34.3	
9.5	47 10.9	49.1		9.3	6 2.4	40.7		9.5	40.6	31.9		9.2	24.2	19.2	A	9.2	41.0	51.0	B
6.7	26.3	0.1	A	9.0	18.8	33.0	G	9.2	59.0	31.1	A	8.9	27.1	21.3	A	9.2	47 22.9	51.2	B
9.0	31.5	37.2		9.5	20.1	56.4		9.5	18 1.2	59.4		9.5	31 13.7	42.0		8.5	48 12.1	37.7	
7.0	33.1	21.9	G	9.1	23.8	42.6		8.8	11.5	28.4	A	9.5	22.5	36.5		9.3	59.2	54.0	
9.4	35.3	26.4		9.3	43.8	2.2		9.5	14.4	57.4		9.5	34.1	18.3		9.5	49 38.6	11.1	
9.3	52.9	18.3		7.5	7 2.0	23.1	G	9.5	16.4	3.8		9.1	35.8	22.8	A	9.4	50 14.4	56.1	
9.3	48 10.5	41.6		9.4	15.6	19.0		9.5	24.7	25.4		9.5	32 21.4	19.9		9.0	42.9	26.3	
9.4	21.8	38.1		9.1	19.3	53.1		9.4	27.9	39.5		9.0	27.9	49.0		8.5	58.6	54.7	
9.5	27.4	14.0		9.5	29.4	25.3		9.5	45.1	3.9	B	9.4	29.5	14.4	B	9.5	51 41.4	14.4	
9.4	44.0	52.5		9.4	46.5	11.8	R	9.3	52.9	55.9		9.4	44.0	36.6		8.7	52 0.9	15.5	
9.4	49 56.3	1.4		9.4	56.0	55.1		9.3	53.9	56.4		8.2	33 8.5	9.2	A	9.5	24.5	42.7	
9.3	50 53.0	35.9		8.0	56.8	35.6	G	9.4	54.1	7.5		8.2	10.8	30.4	A	9.2	53 11.1	37.4	
9.1	51 5.6	16.0		8.1	8 2.9	45.3	G	8.4	56.1	8.0	B	9.2	25.9	41.2		9.1	12.1	11.5	
9.2	39.1	4.7		9.5	5.0	25.3		9.5	19 10.0	53.8		8.0	37.7	17.5	A	9.3	13.5	56.5	
9.3	45.8	10.1		9.4	21.9	24.0		8.2	22.5	23.5	A	9.1	53.9	13.6	A	9.5	15.7	47.1	
9.5	52 16.9	49.8		9.2	29.5	59.8		9.1	20 10.0	29.7	A	9.4	34 14.2	48.8	A	8.9	53.5	43.1	B
9.5	53 7.7	26.8		9.5	34.7	38.7		8.5	13.2	56.7	B	9.1	29.8	19.5	A	9.1	56.4	51.3	
9.5	11.1	38.3		9.5	41.6	39.2		9.5	29.0	8.7		8.0	30.0	52.1	A	9.2	54 17.3	1.2	
9.5	16.2	16.7		9.5	43.5	9.3		9.3	33.1	43.5		9.4	52.7	4.0		8.3	29.3	25.9	G
9.5	41.8	8.2		8.5	9 0.6	44.1	G	9.5	54.3	11.0		8.7	57.9	15.3	A	9.4	49.6	8.9	
9.2	45.3	7.5	B	9.2	3.2	43.3	B	9.3	21 12.3	1.6		9.0	35 36.6	38.4	A	8.8	55.3	11.5	G
9.3	54 2.9	28.2		9.5	39.8	45.0		9.5	23.1	53.2		9.5	39.5	25.5		9.5	55 7.4	31.3	
9.0	27.7	7.4		9.0	50.5	42.8		9.2	33.7	59.6		9.4	36 9.6	0.8		8.8	50.7	8.1	
9.5	53.4	35.8		9.5	50.7	2.2		9.5	22 0.6	7.0		9.5	46.2	58.7		6.5	56 30.6	27.8	G

2901—2943				2944—2986				2987—3029				3030—3072				3073—3115			
	22h—23h	+54°			23h	+54°			23h	+54°			23h	+54°			23h	+54°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.7	56 41.3	44.2		8.8	10 59.8	17.9	B	9.0	21 47.3	35.3	A	9.4	36 10.5	59.3		9.0	48 55.5	22.5	
9.5	57 14.1	12.0		9.2	11 7.6	55.1	A	9.0	49.2	7.4		9.2	27.0	54.1		9.5	49 1.3	48.3	
9.2	15.8	36.7		9.1	10.0	44.6	A	9.5	22 18.0	56.5	R	9.2	56.0	45.6		9.5	39.3	38.9	
9.5	26.5	52.0		9.4	25.9	25.4		9.5	22.9	34.2		6.8	37 20.4	24.3	G	6.0	52.5	54.6	G
9.0	49.3	29.8		9.0	12 2.4	25.9		7.8	29.3	21.4	A	9.3	26.5	1.5		9.2	50 0.2	42.3	
8.8	58 0.2	20.0		9.5	6.5	59.8		8.0	23 15.0	28.3	A	7.7	27.9	40.6	G	8.8	2.3	21.5	
9.2	1.1	53.7		9.5	18.1	4.0		9.5	39.5	56.5		8.2	39.9	34.7	G	9.5	25.4	8.2	
9.5	23.6	5.6		9.4	31.9	41.7		9.4	40.7	37.8	A	9.3	52.3	37.5		9.5	51 3.5	2.3	
8.0	28.8	54.7	B	9.3	13 15.0	55.3	R	8.6	58.3	31.3	A	9.3	58.7	40.3		8.5	32.8	34.4	
9.3	59 1.6	40.1		9.3	22.0	54.3	A	9.0	24 18.5	55.8		9.3	38 12.3	41.7		5.0	42.3	56.9	A
9.0	5.4	38.1	B	8.8	56.6	43.6		9.3	19.3	21.0		9.5	44.0	57.5		9.5	52.0	49.7	
9.5	0 20.0	13.5		9.5	14 1.4	26.3		9.0	21.5	56.2		8.9	58.0	13.9	R	8.8	52 7.0	19.1	
9.5	27.6	58.2		9.4	26.8	52.5	B	9.3	29.3	59.5		9.0	58.9	30.8		9.2	12.4	58.8	
9.5	38.4	11.0		9.5	35.7	20.8		9.1	30.5	46.5	A	8.1	39 30.0	21.4	A	9.3	13.8	31.4	
8.6	1 4.7	4.2	A	8.9	42.1	24.9		9.0	52.7	47.1	B	7.3	47.7	3.8	A	9.5	17.1	28.3	
9.5	27.8	18.0		9.4	52.5	43.1		8.8	25 12.5	7.1	R	9.5	56.0	29.9		9.0	23.1	28.1	
9.5	28.4	22.4		8.0	15 1.9	54.1	R	8.5	51.5	58.3	A	9.5	40 13.0	37.2		9.0	24.7	4.4	
9.4	34.3	14.1	B	8.0	5.2	1.5	G	9.5	26 16.5	25.9		9.5	35.1	26.3		9.4	32.0	29.9	
9.5	2 0.2	1.5		9.5	16 0.3	30.3		9.5	36.2	8.4		9.5	41 0.0	21.9		9.0	50.9	54.0	R
9.5	28.4	34.2		9.0	35.7	17.9	R	7.3	27 20.0	41.3	A	9.2	22.3	59.0		8.8	56.4	38.4	
9.5	55.5	11.2		9.5	45.3	43.1		9.5	33.8	10.5		7.7	24.9	50.2	A	9.0	53 20.3	53.9	R
9.5	4 4.3	4.0		9.1	50.6	25.4		9.5	28 26.5	54.1		9.1	31.4	18.9	A	9.5	20.7	40.9	
9.5	10.2	6.6		8.7	17 2.5	49.8	R	9.5	30.9	59.5		9.3	42 5.3	11.3	B	9.5	54 15.0	4.4	
9.5	36.5	14.5		9.2	20.4	51.8	B	9.5	29 58.4	45.1		8.2	21.5	50.2	A	9.5	44.9	38.5	
9.4	43.8	22.3		8.7	36.3	22.9	G	9.5	30 4.3	51.2		9.5	57.7	18.6	B	9.0	47.8	11.1	
9.3	49.0	55.2		7.5	18 17.6	17.9	G	9.5	13.5	21.4	R	8.9	43 24.3	18.7	B	9.1	55.2	36.7	
8.9	5 21.0	30.7		7.5	51.0	38.2	F	9.5	33.6	10.9		9.5	31.9	49.0		9.5	55 3.2	48.8	
8.8	22.1	56.3	B	9.5	56.6	21.4		8.9	39.5	8.9	B	9.0	44 25.4	14.4	A	9.5	4.3	57.5	
9.5	51.6	31.9		8.8	19 19.6	18.7	B	9.2	43.6	2.8	R	8.8	55.4	39.2	A	8.3	12.6	46.9	A
9.5	6 0.9	23.1		9.4	27.7	17.9		9.0	31 12.8	56.5	R	9.5	46 7.0	57.5		9.5	42.0	45.6	
9.2	2.2	24.6		9.1	55.3	11.5		8.5	12.5	25.3	R	9.5	26.6	5.3		7.9	56 1.9	44.9	A
9.5	40.4	36.8		8.7	20 9.0	11.5	G	9.1	13.8	16.9	R	9.3	30.0	4.7	B	8.5	3.8	15.6	A
9.2	7 3.4	10.0		7.9	25.6	4.2	A	8.5	35.7	0.6	R	9.0	48.4	38.2		9.5	41.8	54.0	
9.5	4.3	30.3		9.0	26.4	0.8		9.0	45.8	51.5		9.2	54.0	33.7		9.5	47.7	28.5	
9.4	53.6	20.5		9.3	35.0	45.5	A	9.2	32 21.0	29.2	R	9.2	58.9	46.6		9.0	57 18.7	21.5	A
8.9	8 3.9	39.7		8.5	44.9	24.3	R	9.4	30.6	33.7		9.4	47 11.0	41.7		8.9	58 6.3	27.5	
9.4	11.6	4.7		9.5	51.9	48.0	B	9.4	59.0	44.6		8.2	20.8	19.4	B	7.0	12.0	53.6	A
8.5	32.6	9.0		9.2	56.7	41.8	A	8.8	33 39.7	25.3	A	9.5	33.5	13.7		9.0	22.5	37.4	
9.5	41.8	36.3		8.8	21 6.7	52.5	A	7.9	44.9	20.4	A	9.4	40.2	0.7		9.4	59 4.9	12.3	
9.5	9 17.0	5.5		9.5	10.0	54.5		9.3	34 16.0	12.5	R	9.4	42.6	4.8		9.0	9.6	38.6	
7.9	10 0.0	24.0	B	9.1	36.7	32.3	A	9.5	54.5	57.8		9.0	56.3	31.2		9.0	32.5	5.2	
9.5	27.1	54.6		9.1	39.4	30.4	B	9.4	35 35.1	1.8		9.5	48 39.0	47.1		9.4	33.0	3.8	
9.5	40.0	41.5	A	9.3	45.1	1.5		9.5	36 7.4	7.0		9.5	41.8	31.5		8.8	55.1	50.0	L

Zone +55°

1—40				41—80				81—120				121—160				161—200			
	0h	+55°			0h	+55°			0h	+55°			0h	+55°			0h	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	0 10.3	36.7		9.3	10 22.5	7.0		9.5	20 15.0	35.9		9.5	29 15.2	29.7		9.3	38 48.9	46.4	R
9.5	21.8	34.9		8.7	30.0	4.7		9.5	21 9.1	44.6		9.5	29.0	23.2		9.3	56.5	31.6	
8.4	45.2	36.8	A	9.1	11 12.0	32.3		9.5	22.6	57.0		9.3	37.2	56.2		9.1	57.4	11.4	
9.3	47.6	22.3		8.7	28.8	10.2	R	9.5	27.0	2.2		9.5	40.2	56.7		9.2	39 34.2	6.7	
9.4	52.4	30.4		9.5	35.6	1.5		9.3	29.5	1.7		9.3	42.1	53.1		9.5	47.6	0.8	
9.4	53.1	18.9		9.5	38.3	23.4		9.3	43.6	0.1		9.2	43.0	30.3		8.0	40 19.3	0.7	A
8.9	1 26.5	4.1	R	7.0	12 47.1	45.2	L	9.0	56.1	24.0		9.5	30 30.1	33.7		8.9	25.8	54.7	
9.5	39.2	56.0		9.5	56.8	27.0		9.5	22 3.6	5.0		9.5	35.8	44.8		9.4	35.2	24.5	
9.2	39.4	13.4		9.0	13 0.0	48.5	R	9.4	8.8	28.0		9.3	42.2	27.2		8.8	39.6	30.9	B
9.3	2 2.0	38.7		9.5	10.4	35.6		9.1	17.2	36.7		9.5	56.3	9.9		8.5	42.0	46.5	R
9.4	6.3	34.0		9.5	13.1	1.6		9.5	25.0	47.8		9.5	31 2.4	47.7		8.4	41 51.0	44.4	A
9.1	44.0	43.0		9.5	24.2	11.4		9.5	23 1.6	49.5		9.5	4.3	32.1		9.5	55.3	0.4	
8.5	45.0	45.9		8.4	29.2	35.8	A	8.0	7.7	59.6	B	9.4	11.9	1.9		8.5	42 12.5	49.6	A
8.0	3 4.6	15.0	B	8.3	52.9	24.8	A	8.8	11.5	12.1	B	9.5	13.4	52.1		9.5	13.5	27.7	
7.4	4 3.4	9.3	S	8.3	14 8.0	12.7	A	9.5	25.2	41.1		9.5	41.2	54.6		8.7	29.6	50.1	A
9.5	12.5	38.6		9.2	15.2	47.1		9.5	39.7	8.4		9.4	50.0	0.6		9.3	38.4	13.3	
9.5	47.7	33.2		9.5	32.0	35.4		9.0	46.9	22.9	B	9.5	32 5.8	30.5		9.3	43 2.7	12.9	
9.1	5 1.3	12.2		9.5	39.6	33.3		9.5	58.1	27.9		8.8	11.2	44.7	B	8.5	3.1	42.8	A
9.0	12.4	40.2		9.5	42.1	47.0		9.5	24 1.8	33.3		var	18.8	44.6	S	9.2	4.5	52.3	A
9.4	15.1	52.8		9.5	53.5	30.0		7.8	4.4	12.1	L	9.5	33 37.7	47.6		9.2	12.7	7.5	
8.0	23.6	3.1	B	9.4	15 1.0	37.8		9.5	18.6	9.0		8.4	44.9	16.3		9.3	19.3	11.9	
9.5	38.1	9.7		9.4	23.8	24.2	B	9.5	21.0	33.6		8.7	34 21.2	42.6	A	9.4	19.4	55.2	
9.2	46.3	38.5		9.5	23.8	8.0		9.3	25 2.7	11.4		9.5	35.3	43.0		9.4	21.0	15.9	B
8.4	56.7	38.2		9.5	54.0	36.2		8.8	15.4	44.2		9.4	55.1	48.4		9.4	22.9	51.7	
9.5	6 36.9	38.9		9.0	16 39.1	44.1		9.5	27.8	25.1		7.8	35 11.7	44.2	A	9.5	38.3	1.5	
9.5	40.6	35.4		9.3	46.6	52.0		9.4	30.0	49.5		8.9	18.5	35.2		9.4	39.5	12.1	
9.0	48.5	27.0		9.5	48.0	28.0		9.5	55.5	56.0		9.4	31.7	43.5		9.4	49.7	44.6	
8.9	7 5.1	24.1		9.4	17 30.9	51.5		8.8	26 51.0	58.5		9.3	47.9	53.9		8.2	51.2	28.4	G
9.1	21.0	31.9		8.5	32.8	22.5		8.3	55.0	48.4	A	9.4	36 13.9	58.1		9.5	44 8.0	35.0	
9.4	35.0	23.5		9.1	18 9.5	38.4		9.3	59.2	22.6		9.5	15.3	41.5		9.4	20.7	16.9	
9.4	47.0	20.5		8.3	16.2	33.6		8.2	27 10.6	17.0	B	8.8	20.1	25.8	A	7.7	23.5	50.2	A
9.0	49.3	45.8		7.0	20.7	58.5	L	9.4	31.9	1.6		9.2	34.8	37.3	A	9.3	45 7.7	9.7	
9.3	8 8.0	35.3		8.0	36.9	18.3	A	9.1	32.1	22.2	A	9.5	55.3	16.9		9.2	26.4	10.0	
9.5	16.2	21.7		6.5	45.0	50.4	L	9.1	28 2.4	19.2	A	9.5	57.2	33.5		9.5	46.3	26.5	
9.5	22.4	46.1		9.0	48.2	23.4	A	8.7	12.1	46.0	A	9.5	37 7.0	11.0		7.2	46 1.5	31.9	G
8.9	31.0	3.5	A	9.5	48.5	52.3		8.7	19.2	33.1		9.5	11.1	27.3		9.4	7.0	32.6	
9.3	9 2.0	9.1		9.5	51.2	16.4		8.0	28.7	20.6	A	7.6	27.9	59.3	L	9.5	11.6	10.4	
9.5	27.8	4.8		9.5	19 32.4	39.2		9.5	40.8	32.2		9.5	45.2	20.7		8.5	31.9	35.5	B
9.5	39.2	14.0		9.5	40.5	45.4		9.1	41.0	8.8		9.4	38 5.1	49.6	R	9.4	35.8	59.4	
9.5	10 15.3	32.9		9.4	20 2.3	16.8		8.9	55.1	11.1	A	8.8	12.3	19.3		8.0	42.3	41.6	R

201—260				261—320				321—380				381—440				441—500			
	0ᵘ—1ᵘ	+55°			1ᵘ	+55°			1ᵘ	+55°			1ᵘ	+55°			1ᵘ	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	46 51.6	45.6		9.4	3 3.0	16.4		9.2	16 48.0	33.5		9.5	31 20.0	55.3		9.4	46 26.4	50.4	
9.5	47 11.4	0.5		9.4	19.8	9.8		9.3	17 6.1	29.3		9.5	46.7	49.1		9.5	27.5	54.5	
9.5	31.9	53.7		9.5	35.0	15.1		9.5	36.4	19.0		9.5	32 24.4	30.2		9.5	28.6	56.2	
9.5	38.7	47.5		9.3	36.1	40.5		9.5	40.8	31.8		9.5	27.3	3.6		9.4	35.7	17.0	
8.2	48 4.7	2.0	B	9.0	47.3	38.5	A	9.2	41.4	38.0		9.5	33.8	3.4		9.5	44.1	31.9	
9.5	10.4	50.0		8.5	4 3.5	10.0	A	9.5	44.1	56.6		9.0	40.7	20.3	A	9.5	52.9	39.5	
9.3	25.9	12.5		9.0	11.8	54.3		9.3	48.5	34.3		9.5	33 19.7	30.7		9.5	47 20.5	30.8	
8.4	28.0	27.4		9.4	44.4	15.2	B	9.5	56.0	21.6		8.9	37.2	46.8		9.4	24.6	23.0	
9.5	42.1	45.1		9.5	45.0	49.0		9.1	57.3	42.0		9.0	51.6	30.4	R	9.5	49.5	2.8	
9.4	50.5	41.0		9.1	5 5.1	49.4		9.2	18 6.8	25.1	B	9.5	34 14.2	24.7		9.5	49.5	15.4	
9.3	49 6.3	22.8		8.2	16.9	14.8	A	9.0	14.4	1.6		7.1	24.4	8.8	A	9.5	52.3	17.2	
9.2	11.4	4.5	A	9.5	6 20.9	54.2		8.5	19 5.6	43.1	B	9.2	38.9	18.8	A	9.5	48 8.5	45.4	
9.5	19.5	34.9		9.5	7 13.9	8.2		9.1	10.6	57.1		9.5	41.5	26.1		9.2	52.9	3.0	
9.2	21.4	3.7		9.5	18.3	33.5		9.5	32.3	36.0		9.0	48.4	47.6	A	9.5	54.0	58.8	
9.1	29.0	38.5		9.5	35.4	37.8		9.0	40.1	29.6		9.5	35 5.7	0.1		9.0	58.5	21.6	
8.3	36.9	2.4	A	9.5	44.1	15.7		9.0	20 4.8	19.0		9.5	12.2	5.1		9.4	58.9	24.4	
9.5	37.3	1.9		8.0	8 7.7	44.4	B	8.8	7.5	49.5	A	9.5	15.4	23.2		9.5	49 15.2	38.1	
9.5	50 16.2	27.7		8.6	24.2	38.8	B	9.5	9.8	41.5		9.1	27.0	20.4	A	9.3	20.4	25.9	
9.5	29.5	59.3		8.1	27.3	9.3	L	9.5	52.2	32.3		9.0	33.1	22.5	A	9.5	20.8	50.0	
9.4	55.3	24.7		9.4	45.5	30.2		9.5	21 1.3	59.8		9.5	34.1	10.1		9.5	26.5	0.2	
9.5	51 52.0	30.3		7.2	48.4	52.2		9.5	29.6	0.1		9.5	42.4	11.2		9.5	35.5	3.6	
9.1	52 8.9	45.1	R	9.5	57.3	0.0		9.4	33.8	12.5		8.6	43.3	54.6	A	9.1	37.6	9.6	
9.5	16.4	35.9		9.5	9 1.8	16.7		9.5	44.9	1.5		9.5	58.5	57.6		9.5	40.8	18.3	
9.1	17.2	50.0		9.5	24.4	3.6		9.3	22 8.5	29.0	R	9.4	36 10.9	25.5		8.2	52.2	4.9	A
9.0	53 3.5	7.7	B	9.5	38.2	32.1		9.4	47.1	3.1		9.3	28.7	57.9		8.9	54.4	40.3	A
9.4	6.4	7.0		9.4	55.9	3.2		9.3	23 0.3	30.2		9.0	37.4	37.0	A	7.9	54.6	0.3	A
9.1	14.7	3.6		9.3	10 18.0	39.5		9.3	8.8	19.1	B	9.5	37 28.4	40.7		9.4	50 6.8	50.2	
9.1	21.9	14.4		9.3	18.7	9.1		9.5	13.6	17.8		9.5	50.6	15.0		9.0	12.0	19.5	A
7.2	29.7	32.9	L	9.5	18.7	10.4		9.4	18.6	53.4		9.5	38 2.4	8.6		9.3	21.8	26.3	
9.5	54 6.7	41.4		8.8	28.2	33.7	A	9.3	19.7	57.1		9.1	4.0	51.7		9.5	51 0.0	48.0	
9.5	23.1	3.4		8.9	44.1	41.6	A	9.4	40.8	43.1		9.5	22.6	35.5		9.5	2.7	0.4	
9.5	27.1	38.3		9.4	45.0	37.6		9.3	54.1	34.1		9.5	23.6	21.0		9.4	15.8	24.2	
9.5	55 24.5	32.9		8.9	58.6	50.3	A	9.5	24 1.4	26.0		9.4	29.0	19.8	B	9.5	46.8	17.8	
9.2	25.7	38.2		9.5	59.2	7.0		7.5	9.5	4.1	A	9.4	30.2	19.1		9.5	51.9	6.9	
9.5	30.9	55.6		7.7	11 48.2	26.8	A	9.5	25 2.4	42.7		8.2	54.4	20.3	R	9.5	56.1	30.8	
8.2	33.4	4.1	A	9.5	48.3	11.2		9.5	9.6	8.0		9.1	39 34.4	56.3		9.2	52 2.8	24.7	
9.5	52.0	16.1		9.5	53.8	22.0		9.0	26 0.5	26.8	R	9.4	59.0	54.0		9.5	35.7	53.0	
9.0	52.8	35.0		9.1	55.7	51.3	A	9.4	6.4	16.7	R	9.0	40 37.3	45.6		9.4	38.0	3.7	
9.5	56 29.7	8.4		9.3	12 4.0	4.6		9.5	7.4	41.8		9.5	51.2	50.5		9.3	53.8	32.7	
9.1	57 6.0	37.8		8.7	10.2	39.0	A	7.2	11.5	17.7	L	9.5	59.0	33.6		9.5	53 0.0	56.5	
9.4	56.7	39.2		9.4	11.8	55.1		9.5	16.6	39.4		9.3	41 5.6	21.3		9.5	12.9	21.6	
9.5	58 3.5	21.7		9.5	16.3	19.1		9.3	26.4	57.9		9.5	5.9	1.4		9.3	54.2	57.7	
7.5	27.8	35.9	B	9.0	13 3.3	36.7		9.5	32.6	39.6		9.0	10.2	12.1		9.2	55.7	54.2	
8.8	28.5	54.2		8.7	8.5	41.8	A	9.5	36.8	29.7		9.4	17.7	11.4		8.8	54 3.9	4.4	
9.2	55.2	30.1		9.5	14.8	3.7		9.4	57.2	58.8		9.5	41.8	21.5		8.8	10.8	21.6	
8.3	59 16.5	18.2	B	9.2	30.7	59.0		9.4	27 12.5	59.2		9.4	46.5	9.4		9.1	43.2	51.0	B
9.4	32.0	38.0		8.8	38.6	51.1		9.2	26.3	22.9		9.0	53.7	15.0	R	9.5	46.8	11.2	
9.3	48.7	8.0		9.0	14 2.5	43.2	A	8.8	40.8	14.2	R	9.5	42 12.4	37.5		9.5	54.3	11.2	
9.3	0 33.6	17.6		9.5	10.8	53.3		8.6	28 32.7	36.4	R	9.4	26.0	44.5		9.0	59.9	33.6	
9.3	51.3	1.0		9.5	55.2	27.8		9.3	29 2.5	27.6	R	9.4	43 6.4	35.5		9.1	55 3.8	57.7	
9.5	1 10.9	32.9		9.1	15 23.7	12.2		9.5	9.0	3.8		9.3	12.3	9.5		9.3	11.0	6.0	
9.5	40.8	51.5		9.4	34.8	57.3		9.5	24.4	45.3		9.1	52.4	56.0		8.7	22.2	52.8	
9.3	52.4	44.2		8.6	43.1	26.8		9.5	30 0.1	43.2		9.3	44 8.6	31.9		9.4	35.9	11.6	
9.2	2 4.6	53.3		9.2	44.2	50.0		9.5	18.4	12.3		8.4	16.7	27.9		9.5	57.8	41.2	
8.0	11.8	59.9	A	9.5	16 0.8	31.5		7.5	23.8	2.7	R	9.5	28.7	37.5		9.5	56 10.0	56.9	
9.5	11.9	43.7		9.5	2.0	17.2		8.9	39.6	29.2	R	9.5	58.6	16.9		9.2	16.9	2.2	
9.4	14.8	2.2		9.5	4.5	41.0		9.1	40.4	15.7	R	7.0	45 17.4	51.9		9.4	20.6	12.5	
9.3	25.8	52.1		9.5	6.6	27.2		9.5	50.2	17.9		9.5	45.3	26.2		9.4	40.4	3.8	
9.5	29.7	29.1		9.2	28.3	32.0		9.5	52.1	32.5		8.7	46 7.6	13.6		9.2	46.5	43.0	
8.6	42.0	19.6	A	9.1	37.8	12.9		9.3	56.9	41.0		8.5	15.7	7.1		9.5	57 9.4	57.7	

501—560				561—620				621—680				681—740				741—800			
	1u—2u	+55°			2u	+55°			2u	+55°			2u	+55°			2u—3u	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	57 12.7	41.3		9.0	7 20.1	19.2		8.9	17 13.8	9.8	R	9.5	28 59.2	17.8		8.0	57 26.7	3.8	L
9.0	13.8	32.0		9.5	33.8	7.4		8.4	41.3	56.0		9.5	29 0.3	20.9		9.5	31.8	59.4	
8.7	23.8	20.1		8.5	35.7	5.3	A	9.2	41.6	58.7		9.4	37.1	25.4		9.2	56.8	55.9	B
9.2	29.7	52.6		8.5	41.6	58.1		9.0	44.0	23.0		9.5	40.7	28.6		8.0	58 10.6	29.5	A
8.1	34.3	29.3	B	9.1	43.3	10.0	A	9.4	55.5	3.8		9.5	54.5	58.0		8.4	59 25.5	39.8	A
9.5	36.8	27.0		8.2	51.7	11.4	A	9.0	18 8.7	35.6		9.4	57.7	55.5		9.2	0 0.5	32.4	
9.5	44.0	17.4		8.9	58.0	33.2		9.5	29.1	5.9		9.5	30 4.3	3.0		8.2	13.5	10.8	B
9.5	47.5	26.6		8.2	8 0.2	48.3	B	9.5	38.3	59.1		7.5	10.4	38.9	A	9.4	1 6.4	31.5	
9.4	58 2.9	50.5		9.5	12.7	43.7		9.0	54.4	58.5		7.5	42.0	38.9	A	8.0	41.0	36.4	A
9.4	3.1	46.9		8.5	13.0	53.7		9.2	58.1	48.0		9.5	31 12.6	51.5		9.4	2 19.5	13.0	
9.5	4.8	39.3		8.8	35.1	42.2	B	9.4	58.5	6.2		9.5	20.0	48.2		9.4	30.4	31.4	
9.2	25.9	23.9		9.5	43.8	38.5		9.5	19 19.9	17.8		8.0	45.9	56.5	A	9.2	38.8	57.7	B
9.4	26.6	45.0		9.4	44.8	37.5		9.5	26.3	38.7		9.5	32 4.3	56.5		8.5	53.3	13.0	
9.4	26.8	42.9		9.5	51.3	58.0		9.4	20 4.1	0.4		9.1	30.0	44.7		9.5	57.9	34.9	
8.5	34.8	46.9	B	9.3	9 31.8	12.3	R	9.2	33.7	17.6		9.3	57.1	26.6		9.5	3 14.9	44.4	B
9.4	36.5	8.9		9.5	34.1	40.3		9.5	38.1	35.7		7.8	57.9	52.5	A	9.3	41.3	33.0	
9.5	45.4	28.1		9.5	42.2	41.5		9.2	46.9	3.6		9.5	33 11.5	26.5		8.5	58.5	45.2	A
9.5	55.6	42.9		9.5	43.9	42.9		9.5	21 5.3	0.9		9.2	49.4	49.7		9.2	4 1.2	32.4	B
9.2	58.0	23.3		9.5	47.8	34.7		8.8	10.7	20.3		9.3	55.3	33.2	B	9.2	7.5	51.6	A
9.4	58.1	0.2		9.5	51.8	33.0		9.5	54.2	0.1		9.4	34 12.3	35.4		9.3	7 20.8	42.3	B
9.5	59 3.8	30.0		9.1	56.2	55.1		9.5	22 11.5	5.0		8.5	18.7	7.2		8.9	23.7	14.9	A
9.5	4.4	39.1		9.5	10 6.7	51.2		9.5	22.9	8.5	B	7.7	53.5	56.5	A	8.9	26.0	29.0	A
9.5	5.9	45.6		8.9	11.1	15.3	A	8.7	23 0.9	39.6		9.5	36 9.3	58.4		9.0	8 1.6	58.3	
9.5	17.9	38.6		9.4	18.8	14.0		8.8	7.4	22.6		7.5	15.4	15.9	B	9.5	9 2.1	52.4	
9.5	31.4	38.7		9.5	26.1	29.8		9.0	17.5	15.5		9.5	45.5	33.9		9.5	12.0	1.3	
9.1	39.7	52.7	A	9.5	28.6	22.8		9.4	43.8	51.8		7.5	37 48.1	9.0	A	7.2	27.2	0.2	A
9.2	45.8	9.8	B	8.7	28.9	39.1		9.0	45.3	58.5		9.5	38 21.4	9.8		9.5	27.2	33.3	
9.0	59.9	18.4	B	6.8	39.7	14.3	B	9.5	47.5	47.2		9.5	32.0	17.2		9.5	55.5	49.5	
7.7	0 19.8	52.3	A	9.5	47.8	42.9		9.1	55.0	11.6	A	8.3	41.0	57.5		9.5	10 39.6	34.2	
7.2	28.7	36.3	A	8.5	48.5	8.9	A	9.5	24 8.9	12.3		8.5	39 26.5	14.2	A	8.5	11 13.1	3.1	A
8.7	48.2	43.0	A	9.3	11 5.2	29.6		9.2	13.2	17.1		9.1	47.2	19.1	B	9.4	26.2	11.1	
9.5	1 9.8	22.3		9.5	23.1	30.7		9.3	15.8	43.6		9.0	40 6.4	17.8	A	9.5	36.9	10.1	
9.5	15.0	12.3		9.5	26.3	9.1		9.5	21.0	55.3		9.5	9.0	2.3		9.2	51.7	36.0	B
8.2	34.3	28.5	A	9.4	41.5	55.0		9.2	25.7	27.6		3.5	11.0	17.7	A	9.4	12 3.0	46.0	
8.1	34.3	26.4	A	9.5	50.2	26.0		9.0	42.3	20.4	A	9.5	39.1	9.6		9.3	12.6	14.1	A
9.0	51.6	42.8		9.1	54.9	51.7		9.4	53.2	36.6		9.5	41 56.5	57.0		8.2	23.7	36.1	B
9.5	53.2	53.7		8.2	57.9	56.2	B	9.5	25 10.8	18.4		9.0	42 6.4	20.3		9.5	34.0	19.0	
9.5	2 0.0	46.1		5.7	12 18.5	10.8	A	9.4	33.8	0.2		9.4	13.5	11.0		9.5	13 47.2	59.3	
9.5	41.3	51.8		9.5	38.1	12.4		9.5	42.2	11.1		9.3	28.6	14.4	B	9.1	14 1.8	14.2	A
9.2	43.8	46.5		8.3	45.6	57.4	A	8.2	55.9	17.5	A	9.3	44 34.6	53.0		9.5	20.0	3.4	
9.5	58.1	13.0		8.8	48.7	41.3		9.5	26 0.5	47.5		9.2	44.2	7.2		9.4	41.3	17.0	
9.2	3 33.9	56.3		9.5	53.1	50.9		9.5	5.2	38.5		8.5	50.3	27.1	A	9.4	47.6	21.8	
9.0	38.2	53.0		9.0	55.0	24.8		8.6	17.6	17.4	A	8.4	45 13.3	53.5		9.2	57.9	13.5	B
9.3	44.0	47.6		9.5	13 18.4	26.6		9.0	19.5	15.3		9.5	45.5	58.9		9.5	15 1.4	5.5	
9.5	47.0	35.1		9.3	24.9	54.8		8.3	20.9	33.5	L	9.1	49.0	45.7		7.8	11.3	37.5	A
9.3	4 9.2	11.2	B	9.5	34.3	27.4		9.5	29.2	56.8		8.0	52.5	34.9	A	9.4	16 47.7	55.9	
8.9	12.3	48.7		9.4	14 0.8	55.4	A	7.7	34.1	16.3	A	9.0	46 46.3	3.5		9.0	52.4	13.5	A
9.5	50.1	41.9		9.2	17.2	6.6		9.1	41.9	16.2	A	9.4	47 17.5	27.1		9.5	17 0.5	36.9	
9.4	59.9	54.7		8.8	31.6	46.4	A	8.8	43.6	6.8	A	9.2	20.5	14.8	A	9.5	6.3	53.8	
9.5	5 2.2	53.5		9.5	44.2	13.4		9.4	58.2	2.4		8.2	26.0	17.2	A	9.2	9.8	32.8	
8.0	2.5	4.0	B	9.4	48.3	19.6		8.4	59.0	18.9	A	9.5	48 20.6	50.6		9.3	31.7	9.2	A
8.0	5.6	6.8	B	6.3	15 4.4	56.4	A	9.3	27 9.8	1.5	A	9.5	47.1	3.6		9.5	40.6	38.4	
9.1	43.8	27.1	B	9.5	10.3	32.2		9.5	12.3	57.5		8.5	49 39.3	43.9	B	9.2	19 46.2	26.9	A
7.9	47.4	19.0	B	9.5	20.2	54.6		8.7	23.8	19.7	A	9.4	44.6	18.7		8.1	20 40.6	56.8	L
9.5	51.2	27.2		9.0	45.8	59.9	A	9.5	29.9	53.5		9.4	50 7.2	51.6		9.5	21 39.7	21.0	
9.4	54.3	13.0		8.0	47.6	26.3	A	9.1	31.0	15.6		8.5	39.7	48.6	L	9.3	57.1	24.3	
9.5	6 25.7	48.7		9.5	16 28.7	11.4		9.5	28 3.9	48.5		8.7	56.3	26.5		8.2	22 25.5	3.5	A
9.5	26.3	46.3		9.5	47.5	23.2		9.5	7.0	5.6		6.3	54 52.6	30.0	B	8.5	42.0	49.0	B
9.3	43.7	22.2		9.5	17 10.1	22.4		9.1	11.0	15.7	A	9.1	56 37.6	11.4		8.5	43.9	36.0	A
8.4	7 9.6	14.5	A	9.2	11.4	43.9		9.5	13.5	56.6		9.4	57 16.5	3.9		9.5	45.7	52.0	

801—860				861—920				921—980				981—1040				1041—1100			
	3h—4h	+55°			4h	+55°			4h—5h	+55°			5h	+55°			5h—6h	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.0	25 11.1	23.4	A	9.5	5 20.4	54.3	B	9.3	34 7.9	12.6		9.5	8 17.0	27.9		8.7	49 31.3	31.1	A
9.4	28 26.4	8.3		9.5	34.1	50.5		7.8	30.1	22.8	A	9.2	17.0	53.5		9.3	34.7	25.4	B
7.0	26.8	54.2	B	9.1	52.2	2.7		9.4	46.2	6.7		9.3	23.4	14.7		9.2	59.8	16.1	
8.5	39.7	16.8	B	9.0	6 42.8	49.5	A	9.5	51.6	1.4		9.5	27.6	2.4		8.0	50 0.0	17.8	A
8.2	40.6	24.1	B	9.0	7 29.5	11.7		9.2	35 0.4	55.0		9.1	9 56.6	46.9		9.0	0.8	8.0	
9.5	42.0	57.7		9.5	8 30.4	33.2		9.0	43.1	19.9		9.5	10 15.4	29.4		9.3	21.5	48.2	
9.5	29 17.4	31.2		8.5	9 4.2	44.0	A	8.2	36 7.4	46.5	L	9.5	26.5	39.2		9.2	51 16.8	31.2	
9.4	52.7	46.5		8.0	26.2	10.7	L	6.5	15.0	20.2	A	9.3	44.5	5.8		9.3	21.6	28.1	
9.5	59.1	14.3		8.0	30.6	9.2	L	9.5	20.7	30.4		6.5	11 34.9	56.3	A	8.9	35.8	17.7	B
9.2	30 41.2	28.9		9.4	11 30.0	36.5		9.4	29.8	3.5		9.2	48.0	17.2		9.5	52.1	5.0	
9.1	31 10.2	22.9		9.5	31.9	46.2		9.5	38.6	2.6		8.8	13 16.9	15.4		9.0	52 0.4	30.6	
8.8	11.9	11.1	B	9.0	44.0	22.9	B	8.7	41.0	28.3	B	9.5	14 58.4	4.3		9.3	9.3	53.6	
9.3	25.2	14.9		9.5	12 15.6	29.1		8.8	48.5	24.9	A	9.4	15 13.3	23.6		9.5	58.5	10.0	
9.2	32.1	45.5		9.0	36.0	38.9	A	9.5	38 37.1	41.8		9.2	18 42.5	12.9	A	9.3	53 39.4	20.8	
8.2	35.1	55.3	A	9.5	57.6	48.8		9.2	39 4.5	7.8		9.2	19 38.2	24.1	B	8.9	50.8	51.2	A
8.9	42.8	4.1		9.4	13 18.0	32.1	A	8.9	33.0	35.8	A	9.0	20 23.3	49.7		9.1	55 25.5	3.1	
9.5	32 26.9	11.3		8.7	20.1	44.6		9.0	36.0	6.9	A	9.0	21 53.3	38.5		9.5	56 10.9	12.8	
9.5	33 3.1	58.3		9.5	30.0	1.9		8.6	41 57.9	48.0	L	9.4	22 38.6	15.9		7.4	57 10.9	58.8	A
9.5	15.5	49.0		9.4	40.0	45.0	A	9.1	42 52.3	11.4	B	9.3	24 48.8	58.0		9.1	33.3	6.3	
8.2	55.7	43.2	A	9.5	54.7	54.9		9.1	58.4	28.6		9.4	26 19.7	18.1	B	9.2	0 41.9	42.8	
8.4	34 47.7	54.1	A	7.0	15 6.0	18.7	A	5.8	43 14.1	1.2	A	9.5	32.8	21.8		9.2	50.0	59.4	
8.7	35 8.6	49.9	A	8.5	54.8	50.8		9.2	24.1	40.2		8.0	42.4	38.9	A	7.8	1 19.1	36.7	B
9.5	38.1	12.0		9.5	17 18.5	9.3		9.5	27.0	15.7		9.4	27 4.4	33.0		9.0	38.8	56.5	
6.5	36 13.0	28.3	A	9.5	36.0	4.3		8.9	44 35.0	48.0	A	9.3	9.6	58.0		9.5	3 58.9	59.0	
9.3	50.3	11.6		8.9	18 33.5	10.3	A	7.5	54.5	35.1	A	9.5	27.5	28.1		9.3	4 53.5	3.3	
8.5	58.1	39.7		9.5	56.4	37.9		9.0	46 46.2	49.2	A	8.0	28 35.4	1.1	A	9.3	53.8	6.0	
8.5	37 41.7	24.9		9.5	19 2.9	0.8		9.1	47 5.2	16.9	B	9.5	29 6.0	46.2		9.0	7 18.8	56.5	
9.0	39 37.6	40.2		9.4	20.5	40.5		9.4	28.6	31.1		9.0	30 10.1	18.8	A	9.0	9 52.0	0.1	
9.3	40 23.4	1.2		8.7	53.0	33.2	A	9.4	31.0	20.3		7.5	31 34.8	14.4	A	8.6	57.9	41.8	A
9.0	33.5	34.2		9.5	20 8.5	17.4		9.5	48 32.9	24.2		9.5	32 32.5	52.2		9.0	10 54.3	11.5	A
9.5	41 1.4	7.0		9.4	8.8	54.5		9.5	51.8	50.0		9.2	37.1	48.1		9.5	56.0	7.2	
9.1	36.5	23.9		9.1	59.1	16.5	B	7.4	49 48.0	21.2	A	8.6	46.7	37.9		9.1	11 59.4	13.8	
9.5	43 54.7	54.3		9.5	21 21.2	42.2		9.5	50.5	4.9		9.5	48.6	4.0		8.9	12 56.4	41.3	
9.5	55.8	33.7		9.5	21.8	40.3		8.9	50 43.1	44.6		8.0	35 10.0	34.0	A	9.1	13 5.3	43.8	
9.2	44 37.4	13.2		7.5	33.1	8.9	B	9.4	51 28.6	45.4		9.5	36 21.9	49.2		9.2	41.0	39.4	B
9.1	45 34.6	27.9		9.4	43.0	30.6		7.4	54 38.8	9.1	L	8.6	46.1	31.6		7.9	58.3	55.1	A
9.2	46 34.2	29.8		8.9	53.0	31.0		9.3	49.4	39.9	A	9.2	37 11.3	4.0	B	7.8	14 1.1	46.4	B
9.2	49 18.1	4.3		9.5	23 29.0	3.8		7.3	55 35.0	19.8	A	9.5	49.4	28.6		9.5	15 40.0	23.6	
7.5	51.1	37.2	A	9.5	24 2.4	38.0		7.1	47.2	32.9	A	9.5	52.8	38.4		9.1	50.9	32.0	A
8.7	50 9.2	45.6		8.5	14.3	8.1		9.3	56 30.6	15.0	A	9.5	38 23.8	37.0		9.3	56.0	47.1	
9.4	24.7	21.5		7.4	15.8	12.3	B	8.0	35.1	54.2	A	9.4	39 24.8	3.6		9.5	16 40.4	52.5	
9.2	50.9	56.6	B	9.5	25 11.3	17.8		8.9	59.4	44.5	A	8.0	25.7	12.8	A	8.5	18 11.9	54.6	
8.2	51 6.0	58.8	A	9.2	25.8	39.8		9.5	59.7	56.8		9.2	40 30.4	3.9		7.7	18.5	46.9	B
7.5	22.0	50.5	A	8.7	59.0	49.2		9.4	58 0.4	48.0	B	8.8	41 21.6	20.2	A	9.2	36.9	49.6	
8.8	52 51.9	35.7		9.5	59.9	34.7		9.5	59 26.1	42.3		9.0	45.4	49.7	A	9.5	36.9	43.2	
8.5	53 0.0	20.0	B	9.5	27 54.2	46.5		8.8	0 4.2	23.6	B	9.5	48.6	5.7		9.5	19 16.0	6.1	
9.5	56 20.8	1.2		9.3	28 6.9	59.8		9.3	28.7	18.3		5.0	42 42.3	40.4	A	8.0	40.0	43.2	B
9.5	42.3	49.5		9.1	7.5	26.7	B	9.4	1 55.0	38.3	A	7.0	44 56.7	55.8	A	9.2	20 6.9	58.5	
9.5	58 22.8	35.8	B	9.5	17.0	20.2		9.5	2 22.0	17.5		9.0	58.0	26.4		8.5	39.4	42.1	B
9.5	59 1.3	20.6		9.5	17.8	4.8		9.4	3 0.1	36.8		9.2	45 15.8	58.0	A	9.2	51.6	52.8	
8.9	36.1	26.8	A	8.5	29 0.1	34.3	B	9.5	5.2	55.1		9.5	24.0	39.6		9.3	21 32.2	6.9	
8.5	40.4	30.8	A	9.5	5.7	51.6		9.5	8.7	56.0	B	7.1	31.8	37.9	G	9.0	50.4	58.0	
9.5	0 5.2	21.4		9.5	28.5	16.7		9.3	13.5	18.5	A	8.2	46 1.9	53.1	A	6.7	22 28.3	27.3	A
9.5	42.7	44.0		9.3	30 40.4	45.9		9.3	22.7	22.0		9.0	12.0	37.0		8.0	59.7	35.8	A
9.0	1 50.5	55.6		9.4	57.4	10.1		9.5	4 9.0	24.0		9.1	38.0	48.6	B	9.0	23 40.6	27.7	
9.0	55.1	23.4	A	9.3	31 10.0	25.1	A	9.0	5 4.2	15.6	A	6.5	47 41.2	17.9	A	8.0	52.0	46.5	A
8.8	2 21.9	21.5	A	8.5	32 14.1	15.3		7.3	37.5	20.7	A	9.0	49.0	12.3	A	7.0	25 37.0	27.9	A
8.6	30.0	30.3	A	8.7	58.5	46.8		9.5	6 12.1	29.4		8.6	48 31.6	30.6		9.3	46.0	31.6	B
9.5	34.2	37.2		9.5	33 30.0	32.0		8.9	34.2	3.5	A	9.2	33.6	18.2		9.4	26 35.1	7.7	
9.4	3 37.6	45.5		9.5	45.1	3.5		9.5	53.0	1.4		9.4	51.4	5.7		8.7	27 5.0	15.7	A

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	6u	+55°			6u—7u	+55°			7u—8u	+55°			8u—9u	+55°			9u—10u	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	27 5.3	9.0		9.0	51 25.0	27.8		8.1	35 18.0	54.8	A	9.4	18 47.3	39.8		8.5	25 38.3	20.1	
9.2	32.8	50.8		9.3	34.3	2.8		9.5	36.8	41.7		9.3	19 42.0	58.8	B	8.8	29 18.8	30.4	A
9.1	28 15.4	21.3		8.9	53 11.6	30.3	B	8.6	37 38.3	29.8	A	7.5	20 0.5	25.3	A	9.5	31 23.0	5.8	
9.5	43.5	5.6		8.0	14.0	55.2	A	9.4	38 19.6	29.8		7.5	21 54.3	50.2	A	9.5	31.7	6.4	B
9.0	55.6	1.6	B	9.3	32.7	7.4		9.1	54.2	59.7		9.4	22 16.9	28.1		6.7	33 4.3	1.8	A
9.5	29 25.6	43.0		9.0	54 36.5	56.8		7.1	39 47.8	6.1	A	9.4	24 5.5	32.6	R	9.5	13.6	40.1	
9.5	55.1	10.5		8.0	56.8	24.3	A	9.2	40 8.3	7.1		9.3	27 29.2	2.0	B	8.8	37 45.4	11.3	
9.5	30 7.4	1.6		8.9	55 8.7	36.3	B	6.5	41 0.5	34.7	A	9.0	30 11.7	15.3		9.5	38 33.1	20.9	
8.5	50.0	36.3	A	8.8	22.3	41.7	B	9.4	42 7.8	0.5		9.5	24.8	23.0		8.6	52.5	48.4	A
8.0	31 9.0	39.9	A	9.5	57.5	15.0		7.0	42.6	5.1	A	9.3	31 19.7	7.7		9.2	53.6	44.8	A
8.9	33.5	34.7	A	8.5	56 2.4	38.5		9.5	43 24.8	43.6		9.5	33 3.8	15.8		9.2	40 1.6	46.4	A
9.5	32 26.0	11.0		9.5	57 23.4	4.7		9.5	44 18.3	0.2		9.2	35 5.4	36.4		9.1	50.4	11.6	
8.2	42.3	25.3	A	9.0	51.6	31.6		9.0	45 59.2	26.9	A	9.3	37 4.8	48.2		9.5	45 7.1	12.5	
9.1	44.4	44.3	B	7.2	59 33.5	50.8	A	8.8	46 16.7	32.8	A	9.0	39 12.3	17.3		9.5	46 45.5	0.2	B
8.1	50.2	41.5	A	9.2	59.0	47.5	B	8.2	19.6	3.1	F	9.1	41 13.3	28.0		9.1	47 38.3	11.0	A
9.4	33 16.0	16.0		9.0	2 16.8	28.2		9.1	47 15.8	47.5		9.2	54.2	23.2		9.0	48 53.8	45.5	
9.0	36.5	51.3	A	9.3	24.2	4.9	B	8.3	48 58.2	51.4	R	7.5	42 13.8	29.5	A	8.8	49 36.1	29.8	
9.3	34 27.6	53.7		9.0	36.8	58.2		9.5	50 26.3	18.1		9.4	45 28.7	46.2		9.0	46.4	51.9	
9.2	45.4	38.1		9.5	49.0	19.4		9.5	39.8	25.9	B	8.0	46 19.3	13.3	A	8.5	51 15.4	48.5	
9.4	56.7	7.7	B	9.0	4 15.5	49.3		8.0	43.1	0.5	A	9.5	27.3	48.2		9.5	44.3	6.8	
8.7	35 26.3	14.2	B	8.7	48.8	8.4		9.5	53 8.8	46.6		7.5	34.3	23.6	A	9.5	53 24.1	41.1	
6.0	36 5.5	50.8	A	9.5	5 44.5	59.6		7.5	13.0	9.4	S	9.0	48 13.3	39.8		8.8	54 58.6	3.4	A
9.4	22.6	0.2		9.5	6 1.0	19.4		7.8	15.7	54.3	G	9.5	49 9.0	49.1		9.0	55 15.6	48.3	B
9.5	35.9	2.1		9.5	7 3.0	10.5		8.9	28.6	38.0	B	9.4	42.4	54.8	B	8.6	57 8.6	31.2	A
8.7	37.0	24.1		8.0	8 3.0	8.9	A	9.3	54 4.3	19.5	B	9.5	50 37.8	32.4		8.5	58 45.4	50.8	A
9.2	37 7.7	58.2		9.1	15.8	0.4		9.5	55 27.5	11.2		9.5	51 2.1	49.6		9.0	0 8.1	48.0	A
9.3	48.4	37.8	B	9.5	23.9	48.9	B	7.5	56.2	43.6	A	9.2	40.7	56.5		9.5	16.1	1.9	
8.5	38 31.1	59.2	A	9.5	57.0	31.7		9.4	59.7	0.2		8.3	53.5	4.7	A	9.5	1 43.2	22.6	
9.3	39 3.5	14.7	B	9.1	9 14.5	20.8		9.5	56 0.3	8.6		9.5	52 3.2	57.5		9.5	51.6	17.0	
9.5	25.0	21.8		9.0	10 18.0	44.4	A	9.0	14.8	58.8	A	9.2	53 14.5	8.3	A	9.4	3 14.9	56.0	B
8.0	57.6	56.7	A	9.5	30.6	10.1	B	8.8	57 7.8	52.0	A	9.3	54 22.2	22.1		9.3	4 18.0	43.5	A
8.5	40 12.3	20.9	B	5.5	11 1.3	32.7	S	8.9	19.8	28.9	B	6.9	55 11.2	58.0	A	8.3	5 45.6	24.8	A
9.4	34.6	50.0		8.5	3.6	37.1	A	8.8	59.8	35.2	A	9.0	46.0	18.7		9.5	6 59.9	57.7	
9.5	47.6	30.2		8.5	6.0	44.5	A	7.0	58 1.5	40.6	A	9.2	56 45.0	5.0		9.5	7 10.9	21.9	
8.4	49.0	50.2	A	9.5	12 19.2	59.6		9.1	59 7.7	11.9		8.0	57 55.2	39.8	A	8.6	16.1	27.8	A
9.0	41 34.3	55.2	A	9.1	23.6	44.1	A	8.7	23.8	33.8	A	9.0	58 59.3	29.0	A	9.5	30.0	21.2	
8.1	41.9	2.7	A	8.9	44.7	14.0		9.5	30.4	31.3		9.0	59 20.6	4.7	B	9.0	34.1	40.1	A
8.3	42 24.1	50.3	B	9.1	13 29.1	23.8		9.1	54.0	54.6		8.8	26.3	48.2	A	9.4	40.2	10.1	
9.1	46.5	0.6		8.2	14 18.7	47.5	G	9.5	0 8.8	44.5		7.8	36.2	33.1	A	9.4	40.2	51.5	A
9.4	57.2	13.0	B	8.8	16 28.7	24.3		9.5	3 31.8	44.5		9.2	38.5	3.1	B	9.5	8 35.2	40.7	A
9.1	43 11.5	26.3		9.1	17 20.2	27.3	A	9.5	4 44.7	18.6		9.0	43.0	17.7	R	9.5	42.5	5.1	
9.5	46.5	48.4		9.5	35.8	39.5		9.5	5 35.7	54.4		7.8	2 22.3	58.0	A	9.1	45.8	13.6	
9.5	44 11.9	1.1		9.5	38.0	31.7		9.0	36.2	29.9		9.5	28.6	0.9		9.5	9 7.9	57.2	
9.4	32.9	16.0		9.4	39.1	43.0		9.1	6 59.0	2.7		9.3	3 36.9	5.3		7.8	46.4	26.8	A
9.4	45 28.0	25.8		9.5	18 4.9	53.3		6.7	7 12.8	1.4	A	9.5	54.2	26.0		9.4	10 41.8	1.2	
9.2	47 10.6	50.8		9.5	17.6	54.2		9.1	48.0	56.7		9.0	5 25.3	12.9	B	9.1	11 35.4	44.2	A
9.2	52.1	35.6	B	9.5	19 44.5	8.8		8.0	8 43.8	39.2	A	9.0	6 19.2	41.8		9.2	50.8	14.7	A
9.4	53.6	36.0		9.1	25 11.4	0.2		9.1	9 27.4	30.7	B	9.2	11 48.5	42.9	A	9.5	13 57.4	39.6	
9.5	54.3	37.0		9.2	26 27.0	53.2	B	8.6	51.8	28.4	A	9.4	12 59.2	12.9	B	8.8	15 58.3	38.6	A
8.5	48 9.5	56.2	A	7.8	36.7	31.3	A	9.3	10 8.4	22.7	B	9.4	13 12.5	12.2		7.0	17 4.3	8.2	A
9.2	15.0	47.5	A	9.5	28 15.2	42.5		8.4	39.8	48.0	L	7.8	23.0	48.6	A	9.5			
9.3	18.3	36.4		9.5	29 15.8	44.5		9.5	11 39.3	44.5		9.5	29.2	6.2	B	9.[illegible]			
9.0	48.9	8.4	A	8.8	37.3	5.4	A	7.8	12 4.7	3.0	A	8.7	14 22.0	18.7	A	9.[illegible]			
9.0	49 18.5	30.2		6.7	30 11.3	7.0	A	9.5	37.8	35.2		8.9	15 32.5	22.1	B	[illegible]			
7.0	21.3	2.1	A	9.5	29.2	20.5		8.3	14 38.3	52.3	L	9.3	33.5	37.4					
9.1	50 10.7	17.7	B	9.1	31 50.8	7.1		7.7	16 21.5	40.1	A	9.2	19 22.2	41.8					
9.2	17.6	12.9		9.4	33 54.8	27.9		9.0	17 12.2	9.8	A	9.5	37.3	20.6					
9.4	51 16.5	45.5		7.3	34 18.2	59.6	A	9.4	24.5	7.8		9.3	49.4	55.5					
8.7	20.8	4.7	A	9.4	35 7.0	15.6		8.8	18 9.8	46.3	A	7.5	21 10.2	54.0					
9.0	23.5	55.8		8.2	17.3	50.0	A	9.5	18.7	31.6		9.5	23 19.3	27.9					

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	10ʰ—11ʰ	+55°			11ʰ—12ʰ	+55°			12ʰ—13ʰ	+55°			13ʰ	+55°			13ʰ—14ʰ	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	28 50.9	39.1	A	8.2	17 23.9	12.3	B	9.3	9 12.8	38.0		9.5	6 24.6	1.2		9.3	47 25.8	28.6	
9.2	31 26.7	28.3	A	9.2	36.5	8.5		9.4	29.5	11.9		9.5	45.4	55.2		9.5	50.0	0.5	
9.0	55.8	5.2	A	9.4	49.6	10.4		9.1	11 25.5	58.0		9.3	7 26.1	20.0		9.1	48 13.0	54.6	A
9.1	33 38.4	55.7		9.2	18 43.7	47.2	B	7.8	31.7	25.2	B	8.8	36.9	36.9	A	9.5	47.7	51.6	
9.2	41.7	8.6	A	8.1	19 2.9	45.3	A	8.8	12 33.0	2.7		8.5	8 32.3	2.4	A	9.5	59.6	34.5	
9.5	34 46.0	32.6		8.0	21 26.3	37.0	A	9.5	13 43.3	16.8		8.0	49.5	14.2	A	7.0	51 46.5	17.8	A
9.5	35 18.1	11.8		9.1	51.4	16.9		9.4	16 30.1	25.7	B	7.7	9 41.7	9.9	A	9.4	52 22.9	35.7	B
8.0	37 22.4	56.2	A	6.7	22 8.8	10.2	A	8.7	41.3	31.7	A	9.5	10 13.5	29.9		9.0	53 30.1	48.9	
9.1	29.4	48.4		8.3	23 30.9	31.6	A	9.1	17 16.9	21.2	A	9.3	11 13.5	17.1		8.5	56 14.0	3.5	A
8.7	30.0	35.1	A	9.5	58.1	10.4		9.4	34.7	50.7	B	8.8	12 27.3	6.7		7.8	57 43.3	21.9	B
9.5	38 25.5	55.2		9.2	25 1.1	15.4	A	7.7	19 22.6	23.5	F	9.5	13 37.5	9.5		neb	58 1.7	2.2	
9.4	39 48.2	6.4	B	9.4	59.4	45.3		9.3	31.2	22.2		9.5	51.3	58.7		9.5	29.1	32.0	
9.3	41 31.0	38.6		6.0	27 7.0	35.0	A	7.0	34.9	57.9	G	9.0	14 7.0	37.1	A	9.0	36.2	43.8	A
8.6	51.4	15.4		9.3	8.8	9.5		9.5	22 38.0	40.0		9.5	15 6.8	55.4		9.0	59 18.3	30.8	B
9.3	51.8	7.2		9.5	28 0.4	21.3		9.3	24 3.2	40.0		9.5	16 56.3	5.3		9.3	18.7	21.3	
8.8	57.1	30.7		9.5	38.8	9.5		7.9	25.6	55.2	B	9.5	17 5.5	0.9		9.5	32.0	32.5	
8.8	42 43.9	59.5		9.5	29 48.6	58.1		9.0	25 3.6	55.7		8.8	54.6	53.4		9.5	54.6	21.7	
5.7	44 47.4	21.3	A	9.5	30 29.0	9.9		9.5	30.8	49.3		2.0	18 6.2	41.3	S	8.7	0 1.0	56.1	A
9.0	54.5	41.1	A	9.4	54.4	55.1		9.0	41.8	10.6		9.0	32.8	24.8	A	9.5	21.5	38.0	
9.0	55.4	13.4	A	9.5	31 12.9	41.9		8.0	26 7.2	36.5	R	8.8	55.0	20.0	A	9.4	28.7	0.2	
9.5	45 11.8	18.9		6.5	33 51.9	58.1	A	9.0	37.1	46.9		9.0	19 2.5	19.7	A	9.1	3 10.3	2.8	
8.0	19.1	33.4	A	9.5	35 3.0	53.1		9.4	27 43.2	19.3		8.5	3.5	40.5	A	9.4	5 12.0	18.1	B
9.4	43.4	42.8	A	8.8	46.0	17.5		9.5	29 9.3	23.6	B	5.0	25.4	43.8	A	9.5	54.0	26.6	
9.5	46 2.0	41.0		9.5	38 10.5	6.0		8.9	50.7	51.7	A	9.2	31.5	25.1		8.0	6 20.2	5.6	B
9.0	10.3	49.7	A	8.7	35.7	15.3	B	6.8	31 14.8	39.0	A	9.5	41.3	55.1		8.3	7 13.0	33.0	A
9.5	51.0	57.6		9.1	51.2	29.1	A	9.5	41.9	3.7		9.5	20 31.4	37.0		9.5	8 4.6	8.3	
9.1	48 9.9	19.8		9.2	39 37.8	46.3		9.3	32 3.7	52.2		9.4	21 15.3	10.0		7.5	9 8.8	19.2	A
9.5	51.2	28.7		9.0	40 7.9	30.6	A	9.1	33 29.8	51.3		9.1	31.7	56.0	A	9.5	10 51.5	30.0	
8.3	49 0.8	35.0		8.9	47.0	46.8	B	8.8	35 35.9	0.1	A	9.5	24 30.6	51.1		7.8	11 39.3	58.0	B
9.5	11.1	59.5		8.8	42 9.0	34.7	A	9.2	37 40.6	11.9	A	9.5	25 30.0	43.8		9.3	50.7	4.9	
9.2	50 14.4	45.5	B	6.8	30.1	4.3	G	9.2	38 33.6	41.0	A	9.4	50.0	39.9	B	9.1	12 3.4	9.9	B
8.0	15.8	47.2	B	9.2	52.9	37.5	A	9.3	55.7	22.8		9.5	55.0	7.8		7.0	12.3	12.5	A
9.5	51 47.5	49.2		8.5	43 48.5	21.7	A	9.0	40 51.8	35.6		9.5	26 21.6	58.6		9.4	28.8	3.6	
9.4	55.4	33.6		8.5	49.0	6.3	A	8.3	41 48.4	15.4	A	9.3	27 33.7	43.2		9.4	39.4	40.5	
8.9	52 10.2	7.2		9.0	44 27.4	7.9	A	8.2	42 24.9	2.4	A	9.0	47.3	56.1	A	9.4	41.9	51.8	
7.5	53 51.6	48.2	B	8.7	47 2.8	2.8	B	7.0	43 33.7	32.7	A	9.3	28 5.2	2.5		8.8	13 7.4	52.7	
9.2	54 22.2	42.9	B	8.1	53.3	35.1	B	9.5	44 28.5	42.4		9.5	5.5	50.1		9.5	55.2	18.0	
9.5	35.6	8.5		9.4	48 28.9	22.3	B	9.2	29.7	8.7	B	9.1	29 56.9	13.5		6.5	14 6.8	32.6	A
8.5	54.0	17.9		9.4	50 44.3	18.7		9.3	45 34.8	37.5		9.0	57.0	4.5	A	9.0	15 28.6	10.6	
8.3	56 58.3	34.6	A	8.0	51 10.7	17.8	A	9.3	36.7	18.0		9.3	30 6.2	21.0	B	8.6	43.7	20.4	A
9.5	57 34.8	11.4		8.5	57.2	22.1	A	9.5	46 25.2	31.2		9.1	31 9.3	5.0		9.5	16 59.1	41.0	
9.0	58 18.5	50.7	A	9.3	57.2	56.3	B	9.5	47 21.0	6.3		9.5	49.6	15.3		9.5	17 39.3	52.3	
8.8	59 36.2	55.7	A	9.5	53 9.4	31.1		8.3	48 18.2	44.9	A	9.0	32 19.1	0.8	B	9.3	18 41.4	17.5	
9.5	1 38.6	35.6		9.4	54 17.0	57.5		7.7	49 18.1	44.9	A	9.0	43.3	48.2	A	9.3	20 37.9	32.7	
8.5	3 36.4	57.1		9.5	21.6	19.7		9.5	51 51.4	16.5		5.5	35 15.4	24.1	G	8.5	23 31.5	23.7	
6.7	4 17.9	40.9	G	8.6	22.1	40.8	B	9.2	52 11.2	31.3		9.5	36 16.0	17.8		8.8	24 3.4	9.6	
9.5	22.8	27.2		9.5	55 12.8	27.6		9.0	15.1	36.3	B	9.5	16.8	26.1		9.5	11.5	33.5	B
9.2	28.9	12.9		9.2	59.9	37.5		9.3	47.4	56.3	B	9.5	37 56.0	44.8		9.5	26 8.8	36.6	
neb	6 27.0	49.8		9.5	56 51.2	57.5		9.0	53 19.7	27.7	A	9.5	38 34.0	37.5		8.3	42.5	48.9	R
9.5	7 18.4	30.1		8.8	57 43.4	24.1	A	9.0	23.4	5.0	A	8.5	37.0	13.7	A	8.5	48.9	44.9	R
9.1	44.5	1.5		9.3	59 8.3	53.6		8.3	54 0.6	0.4	A	9.5	50.1	32.5		9.0	27 46.5	29.7	R
9.3	47.6	41.4		9.5	0 39.8	41.4		9.5	55 43.7	21.3		9.5	39 56.4	28.1		8.3	28 2.7	22.8	R
8.7	8 51.9	53.6	A	9.0	2 58.4	7.3		9.1	56 33.6	5.4		9.4	40 38.6	6.8	A	9.5	39.4	33.6	
9.3	10 14.1	24.5		8.6	59.9	17.3		9.5	57 59.2	44.4		6.5	41 11.7	9.5	A	9.5	42.6	49.9	
9.0	44.9	25.7	A	8.4	3 5.7	43.3		9.2	58 35.8	4.0		9.5	42 44.4	4.2	B	8.0	29 20.3	52.3	B
8.8	12 14.2	10.7	A	7.8	50.2	10.0	B	9.3	0 52.0	31.3		8.6	44 14.8	4.1	A	9.1	30 19.7	4.6	B
9.5	17.5	8.5		9.2	59.8	6.7		9.5	3 14.5	0.9		8.0	43.0	35.0	A	9.1	31 42.8	47.4	
9.3	40.4	38.0		9.5	4 50.9	43.8	B	9.2	15.7	45.1	A	9.2	46 42.5	15.8	A	9.3	52.5	37.6	
9.0	13 48.5	26.1		9.1	5 1.0	17.6		9.5	52.0	29.3		9.5	45.9	7.9		7.6	32 23.0	29.1	B
9.4	14 1.5	26.7		9.4	7 11.3	55.5		9.0	4 35.4	25.9	A	9.0	55.5	44.5	B	9.4	24.3	23.2	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	14u—15u	+55°			15u—16u	+55°			16u	+55°			16u—17u	+55°			17u	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	33 29.9	38.6		8.6	29 42.4	47.4	A	9.5	11 9.0	21.1		9.5	46 29.9	41.4		9.1	25 52.3	45.0	
7.4	34 8.4	28.0	A	9.0	30 12.4	34.2		9.5	24.5	39.8		9.2	47 5.0	26.5		9.2	53.8	28.3	
9.2	56.1	24.1		9.1	25.4	4.8		9.5	13 49.0	39.2		9.3	15.6	40.4		9.1	26 25.7	52.6	
8.0	37 58.0	25.1	A	9.5	40.4	24.3		9.3	14 15.6	30.1	B	9.2	48 27.2	33.9	B	5.2	29 19.6	17.1	A
9.2	38 8.1	42.3		9.1	58.7	8.7		9.0	27.0	15.7		9.4	51 13.8	22.3		5.2	25.3	16.0	A
8.7	54.3	22.2	A	6.0	32 12.5	6.2	G	9.2	27.0	1.4		9.5	17.2	7.0		9.4	31.0	55.2	
9.0	40 54.6	43.8		9.5	34 27.4	6.7		9.5	27.9	32.6		9.2	37.6	53.4		9.5	30 12.7	40.1	
8.4	41 6.1	33.5	A	8.3	35 59.6	21.0	A	9.5	37.5	46.1		9.3	40.5	23.6	B	8.6	33.9	21.6	B
9.1	42 9.5	7.2		8.5	36 41.9	25.8	A	9.4	15 15.5	17.7		8.8	52 10.6	19.6		9.5	52.5	17.9	
8.8	35.6	20.7		9.4	57.7	1.1		8.4	16 3.9	9.3	A	8.4	53 44.8	44.4	A	9.4	55.0	18.0	
9.5	43 5.8	6.8		9.1	37 2.0	44.4		9.3	24.1	21.1	B	9.3	55 20.1	15.7	B	9.5	31 20.7	30.0	
9.0	45 32.5	18.3		9.5	38 34.5	38.6		9.5	33.1	30.0	B	9.2	35.9	5.5		9.5	20.8	14.7	
8.2	46 33.0	34.9	A	8.7	58.4	0.9		9.1	47.5	19.6		9.0	38.9	20.1		8.5	32 26.3	5.9	A
9.5	47 31.1	33.5		9.2	40 24.1	7.1		9.0	17 0.8	50.1		9.5	48.2	1.4		9.5	33 1.0	59.0	
9.3	48 41.8	5.2		7.7	41 55.9	42.1	A	8.7	23.0	16.7	A	9.2	57 20.1	46.9		9.4	5.6	47.4	
9.2	46.1	6.3	B	9.5	42 58.7	16.0		9.2	43.4	36.4	A	8.6	44.6	45.4	A	9.5	18.0	8.4	
9.3	49.0	37.5		6.5	43 5.4	54.8	A	8.8	18 2.0	25.5	A	9.4	55.3	7.0		9.2	39.5	3.6	B
8.0	49 27.5	36.3		8.8	43.4	49.9	A	9.3	39.2	24.5		8.7	58 38.5	16.6	A	9.4	56.3	28.2	B
9.5	58.6	53.1		6.0	44 6.5	48.9	A	9.3	19 40.7	7.9		9.3	51.4	52.4		9.4	56.8	5.5	
9.1	50 11.4	36.2		9.5	18.6	53.8		9.4	58.0	52.0		8.9	59 44.8	6.5	A	7.4	34 32.8	49.5	A
9.0	51 1.4	32.6		9.0	45 18.8	16.8	B	9.5	58.5	15.2		9.5	45.0	10.2		7.3	35 56.6	50.4	A
9.3	52 16.4	29.5		9.4	57.2	40.0		9.4	20 20.9	1.6		8.9	45.4	16.1	A	9.1	36 8.2	38.2	
9.3	37.9	35.0		8.0	46 27.4	11.5	A	9.1	53.3	29.9	A	8.9	1 2.0	28.6	B	9.5	27.9	7.2	
9.5	38.5	7.2		9.5	49 4.2	49.0		7.2	21 11.0	41.2	A	9.4	52.4	15.1		9.5	28.5	10.3	
9.0	53.1	39.5	B	9.5	16.6	18.3		5.7	17.2	32.3	A	9.4	2 1.7	59.1		9.5	37 4.0	44.0	
9.4	55 16.9	44.0		9.5	50 50.0	17.7		9.1	24.2	31.7	B	9.4	14.0	24.8		9.5	38 37.4	8.5	
8.4	23.0	34.2		9.4	52 17.2	36.4		9.5	22 35.5	26.5		9.5	3 22.6	44.8		9.2	44.9	38.4	
9.1	57 34.9	48.8		9.3	22.3	57.6	B	9.2	23 32.9	9.2		9.5	28.8	38.0		9.4	39 43.2	12.8	
9.3	59.0	25.8		9.3	32.6	50.6		9.5	24 21.7	20.6		9.5	32.7	35.3		7.8	40 1.8	41.8	A
5.5	2 9.9	7.1	A	8.1	37.0	21.5		9.5	25 12.5	49.5		9.5	4 47.9	24.2		8.9	28.9	13.6	
8.9	3 13.9	27.3		8.9	53 19.5	23.5	A	9.1	26 17.5	52.4	A	9.5	52.4	36.8		8.4	41 9.9	13.3	
9.2	26.4	14.0		9.5	33.7	56.0		9.5	28 30.7	59.3		6.7	5 2.2	57.1	A	8.4	38.6	48.7	B
9.0	28.4	48.9		5.1	54 22.5	9.8	A	9.0	30 40.6	2.6		9.5	30.1	23.5		9.3	43 1.1	27.3	
9.4	4 30.3	19.4		9.1	40.6	36.4		9.4	31 30.0	58.5		9.0	6 38.9	6.1		9.3	1.8	48.3	B
9.5	6 22.9	41.0		9.1	59.5	40.3		9.4	35.3	46.1		9.3	7 50.5	11.4		8.3	23.8	35.3	B
8.4	52.0	58.7		9.5	55 27.4	0.0	B	9.5	53.3	18.9		9.3	8 9.7	35.0		9.4	44 7.0	34.7	
9.0	9 44.8	58.7		9.5	56 44.5	39.8		8.3	32 15.0	48.6	A	9.1	13.7	33.4	B	9.0	10.6	11.2	
9.5	11 16.4	6.6		9.5	57 16.2	58.8		8.7	17.4	10.2	A	9.5	31.8	25.6		9.5	30.0	30.8	
9.4	12 20.0	45.0		8.1	42.9	51.6	B	9.3	33.0	59.2		9.5	9 11.0	44.7		9.2	45 21.4	27.6	
9.4	13 2.3	7.6	B	8.4	45.2	42.2		9.4	33 27.5	20.6		8.2	58.9	45.9		8.3	29.6	3.2	L
9.4	14 36.0	51.3		7.8	58 6.0	55.6	B	8.9	35 23.0	56.9	A	7.4	10 41.6	38.5	A	9.1	32.1	21.4	
9.5	15 23.4	54.2		9.5	19.7	12.7		9.1	36 10.5	59.3	A	9.3	11 56.0	21.7		9.5	39.7	7.5	
9.5	16 6.4	36.7		9.0	49.5	36.8		9.5	45.8	29.0		9.5	12 15.9	29.0		9.5	48.0	23.2	
7.8	48.2	50.8	B	9.5	59 23.2	20.6		8.7	37 4.0	23.0	A	9.5	13 9.1	8.6		9.1	59.3	15.6	B
9.3	17 2.5	42.5		9.3	45.4	9.6		8.9	52.5	57.5		9.5	26.0	6.9		9.5	48 1.8	50.1	
9.5	32.7	30.8		8.5	0 1.1	34.8	B	9.5	58.2	46.7		9.2	52.6	58.0		9.5	24.7	54.5	
9.2	18 1.9	40.6		9.5	36.0	11.3		9.5	38 36.0	33.3		9.4	14 16.0	58.9		9.4	32.6	32.7	
9.0	39.0	47.9		9.5	1 1.0	26.5		9.5	38.4	18.2		7.9	38.0	13.1	A	9.5	39.7	17.1	
9.3	47.9	35.7		9.5	11.2	20.6		9.1	39 29.8	59.4		9.5	16 14.2	16.4		8.5	47.0	16.6	B
9.0	48.4	37.2		9.5	2 2.0	4.3		9.2	49.1	11.8		9.5	29.7	35.8		8.5	49 16.8	5.2	
9.2	19 19.5	43.0		9.5	8.6	10.2		9.5	40 1.3	49.5		9.5	17 16.1	10.5		9.5	50 18.9	26.4	
9.4	20 14.7	8.0		9.3	30.5	20.1		6.3	3.0	58.3	G	9.5	18 2.5	15.9		9.5	51 19.0	45.7	
9.4	22 11.0	41.5		9.2	3 9.3	4.0		8.3	41 16.1	12.3		8.2	18.9	4.8	B	9.4	30.1	26.9	
8.0	46.9	24.3	A	9.3	13.3	21.6		9.5	42 0.0	19.6		9.2	53.0	40.1		9.4	48.1	55.7	B
9.3	24 48.4	37.6		9.5	40.9	36.8		9.5	1.3	8.4		9.5	20 59.4	15.9		6.5	52 45.5	59.6	A
6.5	25 11.5	42.5	A	8.3	42.0	49.1	A	6.7	39.6	34.1	A	8.0	21 9.0	25.1	A	8.5	53 0.5	42.2	A
9.1	26 15.1	1.5		9.5	54.7	27.6	B	9.5	43 13.9	15.7		8.5	23 16.6	51.6		8.5	14.7	13.1	
9.0	36.4	43.4	A	8.8	6 56.6	3.5	A	7.0	53.7	40.6	A	9.5	24 21.5	20.9		9.5	54 41.0	18.3	
8.8	27 11.1	4.1	G	9.5	9 8.5	31.9		7.7	45 24.4	39.9	A	8.8	22.3	29.6	A	9.5	41.0	13.6	
8.8	28 3.0	53.2	A	9.1	10 43.3	56.2	B	8.5	28.0	23.6	A	9.1	25 50.8	42.9	B	9.4	55 18.2	13.2	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	17h—18h	+55°			18h	+55°			18h—19h	+55°			19h	+55°			19h	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.3	55 33.1	7.6	A	9.2	19 52.4	44.5		9.5	48 52.5	39.0		9.2	14 40.5	24.9	A	7.0	37 8.5	26.4	A
8.7	56 44.4	41.9		9.5	20 8.1	2.5		8.0	57.8	15.0	R	9.5	16 34.9	44.1		9.0	27.7	56.0	A
9.0	47.6	2.4		9.5	50.3	56.2		9.0	49 12.3	3.1		9.1	47.0	45.4	B	9.0	54.5	59.0	A
9.5	56.3	13.0		9.5	21 9.4	58.2		8.9	50 53.3	33.7	B	8.6	56.2	26.9	A	9.0	38 42.0	48.8	A
9.5	57 26.0	4.2		8.8	36.4	38.6		8.8	51 37.5	46.4	R	9.3	17 2.2	58.2	A	6.8	51.9	7.3	B
9.5	57.1	24.0		9.3	22 15.3	46.3		9.5	52 7.2	19.0		9.0	48.3	13.4		9.5	39 8.5	19.9	
8.5	58 4.9	26.8		9.5	30.1	33.1		9.5	50.0	41.4		9.3	59.1	5.4		9.0	49.5	35.8	
9.1	26.2	36.9		9.5	46.9	7.6		9.5	52.0	32.3		8.0	18 13.5	33.8	A	8.9	57.3	32.3	
8.9	34.2	6.2		8.8	51.7	38.0	R	8.8	53 2.5	7.0		8.4	20.0	27.4	A	9.2	40 13.3	3.9	
9.5	34.9	28.2		9.5	23 0.6	39.8		8.6	54 1.9	0.0		8.0	49.5	28.8	A	8.6	24.2	16.9	A
8.4	44.9	47.9		9.5	28.7	48.4		7.8	55 17.2	14.5	R	8.5	57.0	36.4	A	9.0	25.4	12.2	
8.7	59 10.3	25.2		9.5	24 16.3	13.1		9.3	56.0	14.4		9.4	58.2	23.4		8.5	31.7	49.7	A
9.3	56.8	22.7		9.1	23.8	5.4		9.5	56 27.0	12.9		9.4	19 31.8	32.9	B	9.2	35.0	10.7	
9.5	59.8	51.8	B	9.3	49.1	23.7		9.1	53.0	30.7		7.0	20 4.4	56.2	F	9.2	51.3	16.4	A
9.5	0 2.4	51.8	B	9.5	57.0	21.8		9.3	57 17.5	46.4		9.4	22.8	18.4		9.4	41 8.0	14.4	A
9.4	10.7	41.1		9.0	25 2.4	39.5	A	8.8	18.6	59.2		9.2	42.5	6.4		9.4	11.5	25.9	
9.0	47.9	10.0	A	8.7	15.5	41.8	A	5.7	50.7	27.1	A	8.7	21 2.5	23.4	A	7.5	50.2	29.4	A
9.5	57.4	24.5		7.3	34.2	35.0	A	9.5	58 19.5	10.8		9.3	23.5	39.3		9.4	42 11.8	39.4	B
7.2	1 15.5	16.1	A	8.9	26 10.1	27.9	A	9.1	59 10.3	38.3		7.9	48.7	4.4	A	8.3	30.8	51.3	
9.5	30.4	37.2		9.5	22.8	22.0		8.8	17.5	21.9		9.5	22 11.5	9.0		8.7	34.8	40.2	
9.2	38.7	9.0		9.1	26.2	5.3	A	8.7	0 33.0	23.4	A	9.0	24 16.8	39.8		9.3	43 10.0	14.6	A
9.1	39.9	46.1		8.7	43.2	17.0	A	9.3	50.0	46.3	A	8.6	19.5	3.8	A	9.1	14.3	46.8	
9.5	52.9	0.7		9.0	48.7	3.2	A	9.0	1 43.8	9.9	A	9.3	47.5	46.9		9.5	53.4	58.9	
9.0	2 2.4	56.1		8.7	48.7	47.5	A	8.2	50.4	2.5	A	9.1	25 22.0	22.9	B	9.5	44 16.3	16.9	
7.2	33.3	5.4	A	8.8	27 21.4	52.4	A	9.0	2 1.7	45.0	A	9.3	30.9	1.4		8.9	45 14.2	38.3	
9.5	41.3	23.8		9.5	23.0	43.4		8.9	5.5	40.1	B	9.4	46.8	39.8		7.8	23.0	21.9	A
9.5	42.0	52.6		9.4	28 2.4	43.0		9.0	13.5	38.7	A	9.5	26 7.1	36.8		8.1	33.7	3.4	A
9.5	43.1	50.6		9.5	8.7	59.8		9.4	46.1	47.0		9.2	40.1	16.3	B	9.0	56.0	35.4	A
9.4	3 19.6	22.8		8.2	29 24.0	45.9	A	9.4	3 34.3	55.6		9.5	48.3	17.8		9.4	46 15.0	49.0	
9.5	40.3	49.0		8.9	36.8	3.7		9.1	4 49.7	10.0		9.4	27 0.4	13.6		9.4	20.3	55.6	
9.5	5 7.1	35.2		9.5	44.8	4.5		8.0	5 8.2	9.2	A	6.3	5.7	6.8	G	9.4	39.0	47.3	
9.5	38.8	6.1		9.0	30 13.1	25.5		7.2	22.2	6.0	A	9.0	14.1	7.4		9.5	55.9	9.7	
8.5	6 14.5	20.3		9.0	31 12.4	56.3		9.3	23.4	40.2	B	6.3	32.5	50.2	P	9.2	56.5	36.8	A
8.9	52.0	0.0	A	7.5	49.4	47.9		9.3	41.7	17.0	B	8.3	45.0	16.9	G	7.8	47 12.9	6.4	A
9.5	7 8.0	42.5		9.0	32 44.2	9.9		9.3	6 39.0	26.5	A	6.3	28 10.5	25.4	A	8.3	49 45.7	43.7	A
9.5	15.2	53.6		8.8	33 29.6	11.0	A	7.8	54.2	39.3	A	8.6	19.2	55.8	A	9.5	50 5.4	5.8	
9.0	8 30.3	34.5	A	9.5	30.9	1.8		9.0	7 4.6	56.2		9.4	26.5	38.3		9.5	35.0	58.9	
8.6	9 58.1	55.9	A	8.5	35 36.5	19.5	F	8.0	41.0	8.9	A	9.3	50.3	19.4		9.0	49.5	38.3	
9.2	10 3.8	53.8		7.2	42.7	6.9	A	9.1	8 4.5	8.0		9.0	29 51.0	43.8		9.5	51 8.8	40.8	
9.1	4.7	44.7		8.9	36 18.2	51.8		9.0	14.9	52.9		9.4	30 8.5	20.9		8.4	19.0	25.9	A
9.5	6.0	10.9		9.1	28.0	27.7	B	9.5	19.5	49.3		9.2	20.0	2.4		9.4	52 46.2	18.9	
9.4	10.1	39.0		9.5	37 44.3	8.5		8.7	25.8	54.2		9.3	41.8	51.3		9.5	52.3	37.1	
9.2	31.6	0.8		9.1	46.5	18.5		9.4	9 21.7	13.9		9.5	32 3.8	59.3		9.5	53 5.6	34.2	B
8.7	13 0.5	20.6		8.9	38 15.5	22.5		7.8	23.4	4.2	A	9.2	13.2	6.4		9.5	15.1	48.3	
8.7	8.7	42.6		9.0	49.3	26.3	B	9.4	38.8	47.2		9.3	16.0	32.0		9.5	19.0	13.5	
9.5	33.7	34.7		8.2	39 37.5	28.4	J	9.2	50.9	49.7	B	8.6	43.7	38.8	A	9.5	23.6	48.2	
8.5	14 0.3	38.4	A	5.3	50.9	24.0	G	9.0	10 28.0	7.7	B	9.1	33 20.3	29.3	A	9.5	35.2	20.0	
8.6	11.2	11.3		7.7	40 7.2	18.5	F	9.5	53.8	54.8	R	9.0	44.0	31.8	A	9.4	48.1	21.4	
7.7	45.4	24.5	A	8.8	16.6	53.4	P	9.1	56.4	8.6		9.1	34 51.7	34.3	A	9.5	48.7	48.3	
9.5	46.7	45.6		9.0	41 5.2	11.5	A	7.0	11 25.6	41.3	B	8.4	52.8	59.3		9.5	54 3.0	41.4	
9.0	55.1	6.8		9.2	23.5	6.9	A	9.4	49.1	59.2		9.4	54.3	54.9		8.3	42.4	50.1	A
9.3	15 35.5	19.0		9.0	43 7.2	47.9	A	8.8	12 7.0	42.8		9.5	35 7.8	15.2		8.1	46.1	31.1	A
9.0	37.2	23.8	A	8.7	15.1	56.8	A	9.5	13 1.0	31.8		9.4	8.4	3.6		9.5	52.9	33.2	
8.0	16 29.2	31.4	A	8.8	44 27.9	50.8	A	9.1	8.0	37.3		8.7	51.6	6.3		9.2	56.6	37.5	B
9.4	51.4	1.9		7.8	32.1	38.4	A	9.5	33.6	52.9		9.4	36 6.6	2.0		9.5	55 10.0	7.0	
9.1	17 19.2	40.9		9.5	45 18.0	45.9		9.3	42.7	24.0		9.3	21.5	33.7		9.5	29.5	36.9	
8.7	25.7	21.0	A	9.3	46 20.2	29.7	B	9.0	43.3	24.8	B	9.4	22.9	25.8		9.5	30.6	30.9	
9.5	30.8	22.9		8.9	35.7	1.6		9.5	45.7	50.9	B	9.2	49.6	48.3		8.7	56 32.4	54.7	A
9.0	18 47.8	42.9		9.4	58.9	5.6		8.2	45.7	8.8	A	8.5	54.5	23.9	A	9.5	55.8	57.5	
7.4	19 0.2	3.7	G	9.0	47 39.2	19.5		9.5	14 10.6	51.2		7.2	56.3	32.8	A	9.0	57 3.7	24.0	

2301—2360			
	19u—20u	+55°	
m	′ ″	′	
9.2	57 5.6	36.1	
9.5	10.5	46.1	
9.5	27.9	17.1	
9.1	51.4	20.8	
8.8	59.3	4.3	
9.3	58 1.4	13.5	
8.1	10.2	36.1	F
9.3	38.5	43.6	
9.3	40.6	46.7	
9.4	41.4	38.0	
9.5	42.3	49.7	
8.7	49.0	13.3	
8.9	59 7.0	47.2	
9.1	8.6	29.0	
9.2	0 33.1	37.8	
9.5	1 9.2	44.7	
8.0	18.3	30.6	G
8.6	22.4	54.7	A
9.5	30.2	49.6	
9.5	36.0	14.4	
9.5	40.6	4.8	
8.9	43.7	48.4	A
9.3	49.1	32.3	
6.5	2 3.6	55.3	A
9.5	23.1	51.7	
9.0	49.0	39.3	
9.4	49.4	4.6	
9.2	50.6	19.5	
8.9	3 29.1	55.0	A
9.5	38.5	32.4	
9.5	4 25.7	47.5	
9.5	32.4	11.3	
9.5	53.0	44.1	
9.5	5 0.4	0.3	
9.5	24.4	5.3	
6.5	58.9	36.1	G
9.3	6 15.1	6.0	
9.2	41.5	41.1	
9.4	58.1	57.0	
8.9	7 8.4	59.4	A
9.2	44.9	10.4	
9.5	8 13.3	26.3	
9.5	13.4	21.7	
9.4	47.0	44.0	
9.5	9 42.5	49.9	
9.3	10 28.6	13.0	
8.8	33.1	30.8	A
9.2	42.5	41.1	
9.5	50.3	37.1	
9.5	11 7.1	48.6	
9.5	15.1	13.9	
7.0	40.8	12.8	A
9.4	45.5	17.9	
7.7	12 2.8	10.3	A
9.2	5.8	26.6	B
9.4	18.4	26.0	
9.2	21.4	35.1	
8.8	31.2	40.0	
9.1	52.8	15.0	
6.9	13 20.5	35.5	B

2361—2420			
	20u	+55°	
m	′ ″	′	
9.0	13 29.2	38.1	
9.3	30.5	44.2	
9.4	53.1	26.9	
9.5	14 16.9	11.0	
8.8	28.1	45.8	S
8.5	41.0	33.9	
9.5	45.9	20.4	
8.5	55.7	14.4	B
9.2	15 6.0	16.8	
8.0	20.8	5.3	A
9.3	30.2	17.5	
9.3	52.1	39.9	B
9.5	53.4	33.8	
9.0	54.9	40.0	B
9.0	16 3.0	57.2	
9.0	24.7	43.8	
9.5	29.2	59.1	
9.5	51.3	12.2	
9.5	17 8.0	44.7	
9.5	36.9	5.1	
9.3	18 3.1	55.0	
9.5	5.5	59.8	
9.5	29.8	55.9	
9.5	19 1.5	12.0	
9.5	37.0	40.0	
9.4	47.6	5.0	
9.5	49.0	30.9	
9.5	50.7	9.8	
9.5	57.0	0.7	
9.5	20 24.1	3.8	
8.4	44.5	20.8	A
8.9	46.4	35.1	
9.0	21 9.1	57.6	
9.4	12.9	5.4	
9.5	22 9.8	38.7	
9.0	13.5	44.5	R
8.5	30.2	47.5	B
8.5	35.0	32.6	
9.0	59.1	50.1	
8.8	23 11.4	6.1	
8.6	17.1	58.0	
9.0	25.2	58.0	
9.4	27.0	43.0	
9.5	54.0	43.2	B
9.0	24 1.2	26.5	
8.4	25.3	48.6	
8.7	37.8	39.5	B
9.4	25 17.5	37.6	
9.4	17.6	26.0	
9.5	34.8	2.6	
6.0	48.2	35.0	J
9.1	49.2	53.1	
9.4	26 1.5	22.1	
9.0	4.3	5.7	
9.3	27 11.1	5.4	
8.0	37.3	16.7	B
8.5	51.1	41.5	
9.1	53.1	28.2	
8.3	58.0	51.9	
9.3	59.3	34.6	B

2421—2480			
	20u	+55°	
m	′ ″	′	
9.1	28 4.3	4.4	
8.0	29 3.0	28.4	A
8.2	24.2	32.1	A
9.4	49.5	12.3	
9.2	55.9	16.2	
9.1	30 7.9	52.8	
9.5	32.6	52.8	
9.5	31 19.6	7.8	
9.5	29.3	54.6	
9.3	32.9	41.6	
9.1	36.1	51.7	
9.5	40.8	2.5	
9.4	32 5.2	13.2	
9.5	21.1	12.3	
9.4	24.1	10.8	
9.4	38.5	35.1	B
9.2	40.7	48.9	
9.5	42.9	31.6	
9.5	42.9	26.7	
9.0	33 51.3	4.2	
9.0	34 12.0	55.7	
9.5	14.7	27.6	
9.5	28.8	36.1	
6.5	35 14.4	30.0	A
8.4	18.1	40.8	A
9.1	56.9	42.2	
9.2	36 3.5	45.0	
8.7	41.9	6.0	A
9.0	37 3.9	57.7	A
9.4	38 17.5	2.8	
9.3	44.5	54.5	
9.5	47.0	17.8	
9.5	48.1	4.9	
9.5	48.7	45.7	
9.2	39 16.6	13.2	
9.3	16.8	19.6	
9.5	26.1	56.4	
9.5	59.4	7.8	
9.0	40 0.5	31.5	
8.5	10.1	18.5	A
8.0	27.8	38.9	B
6.0	36.5	57.5	A
8.3	53.7	55.5	A
9.5	41 20.8	5.1	
9.5	27.7	30.9	
9.0	43 18.7	35.4	
8.8	37.4	21.0	
7.5	37.5	2.4	A
8.8	58.1	30.0	
8.9	44 1.6	26.2	
8.9	5.7	18.3	
8.9	8.1	55.6	
9.5	11.6	5.8	
8.5	50.8	16.1	A
9.0	45 25.1	49.3	
9.2	44.0	59.4	
9.5	52.5	41.8	
9.2	46 2.0	14.6	
7.8	47 37.1	49.1	A
9.5	54.6	56.2	

2481—2540			
	20u—21u	+55°	
m	′ ″	′	
9.5	48 19.6	56.7	B
8.7	49 32.0	49.0	A
9.2	40.1	18.6	
9.5	42.2	26.1	
9.5	43.5	15.6	
6.9	58.2	48.4	A
9.5	50 8.2	42.8	
8.9	51 25.6	3.5	
9.5	52 6.2	43.8	
9.4	48.8	3.7	
9.3	53 0.8	10.6	
9.5	9.5	3.9	
8.8	23.3	9.0	A
7.8	54 1.3	33.9	A
7.9	23.9	5.4	G
8.8	26.5	41.5	A
6.8	55 26.6	21.3	A
9.5	59.5	29.3	
9.0	56 19.1	55.8	
8.5	20.6	12.4	B
9.2	30.0	0.4	
9.5	31.5	29.8	
8.6	34.7	44.1	A
9.5	35.5	33.9	
9.5	57 10.9	21.3	
8.0	19.1	40.6	A
9.5	24.3	26.3	
9.5	48.0	32.2	
9.1	58 55.7	25.3	
9.1	59 36.6	55.4	
9.5	48.2	51.0	
9.4	58.5	2.5	
9.3	0 27.7	50.0	
7.7	39.9	0.4	A
8.0	50.4	49.0	A
8.0	55.9	42.0	A
8.0	56.2	47.0	A
9.5	1 3.5	54.7	
9.4	13.0	0.5	
9.5	31.8	58.1	
9.1	35.5	6.6	
9.2	40.7	23.8	
9.5	2 7.9	52.4	
9.2	51.7	41.0	
9.1	3 0.3	48.2	
9.2	27.9	9.9	B
9.5	38.0	26.3	
9.5	4 7.3	9.7	
7.5	17.0	31.2	A
7.5	17.3	26.8	A
9.4	20.8	54.1	
9.5	27.5	3.7	
9.5	45.0	44.0	
7.8	5 15.4	6.0	A
9.[illegible]	18.4	39.1	
9.0	33.6	7.2	G
9.4	6 39.4	48.8	
8.2	7 1.0	45.5	
9.5	40.8	58.7	
7.5	48.3	32.1	A

2541—2600			
	21u	+55°	
m	′ ″	′	
8.5	8 6.7	21.8	A
9.1	9 31.8	19.3	
9.4	10 27.5	40.3	B
9.0	28.9	30.6	A
9.0	29.8	33.6	A
9.4	11 48.7	30.1	
9.3	51.7	43.0	
9.3	53.5	49.0	
6.0	12 55.0	10.4	G
9.5	13 40.0	50.4	
8.9	59.3	15.3	A
9.5	14 20.7	33.3	
9.1	20.8	1.8	B
9.5	43.1	38.2	B
9.5	44.7	27.2	
9.5	59.1	37.5	
9.3	15 2.7	33.4	
9.2	14.3	14.3	
9.4	15.8	39.4	
7.8	24.0	35.1	A
7.5	57.9	52.2	G
9.1	16 1.5	2.9	
9.3	29.7	46.6	
9.5	32.6	37.1	
7.4	48.8	54.9	G
8.9	17 29.9	2.2	
8.4	53.0	0.4	A
8.9	18 0.6	47.3	
8.7	15.7	53.6	
8.3	28.8	1.9	A
8.0	39.7	9.4	A
9.5	19 7.7	7.5	A
9.3	9.7	10.0	A
9.4	10.4	40.5	
8.7	20 0.4	44.3	B
8.5	0.5	28.3	B
9.0	2.8	38.0	
9.3	12.7	26.7	
9.4	16.5	22.0	
9.4	21.4	45.0	
9.4	46.2	15.1	B
9.3	47.5	40.3	
9.3	21 11.0	24.2	
9.2	24.3	57.4	
8.7	42.4	3.6	A
9.0	48.7	37.9	B
8.8	50.5	53.3	
9.2	22 14.3	53.6	
9.5	26.6	15.4	
9.5	32.5	4.5	
9.1	33.6	[illegible]	
9.3	39.8		
8.9	47.6		
9.4	23 37.[illegible]		
7.8	5[illegible]		
8.9	24		
8.4	26		
9.3			
9.5			
9.1			

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	21h	+55°			21h—22h	+55°			22h	+55°			22h	+55°			22h—23h	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	29 30.0	16.4		9.4	53 35.3	15.3		8.9	13 23.3	24.2	A	9.5	31 24.5	57.2		9.5	49 9.0	49.8	
9.0	34.5	9.9		9.5	43.8	12.2		9.5	46.1	24.0		9.5	43.4	25.7		9.5	10.3	33.1	
9.3	58.3	49.9		9.1	45.3	5.3	B	8.8	47.8	33.6	A	9.1	32 47.6	5.1		9.5	12.0	35.3	
9.0	30 4.7	54.9		9.5	54 51.7	14.4		7.5	14 20.5	27.3	A	8.9	33 8.4	42.1	B	9.5	12.2	58.4	
9.3	18.8	39.6		9.4	55 22.9	19.9		9.5	53.4	39.6		9.5	25.2	39.3		9.5	21.7	28.3	
9.0	31 9.9	14.8		9.4	48.5	49.5		8.9	55.5	22.1	A	9.4	38.5	34.2		9.4	24.9	4.6	
9.5	32 10.5	42.4		8.5	56 1.7	18.1	A	8.5	15 20.5	22.2	A	8.6	34 3.6	24.5		9.5	42.3	41.9	
8.9	26.3	18.7	B	9.3	59.9	5.4		9.1	29.8	17.7	A	9.5	54.8	36.7		9.2	52.5	47.0	
9.5	51.0	54.4		7.8	57 20.9	15.7	A	7.8	38.7	15.7	A	9.0	35 41.3	40.6	B	9.5	50 0.0	15.3	
8.8	55.5	6.7	B	9.1	58 19.0	5.8	B	9.5	16 0.8	43.6	B	9.3	42.4	30.5	B	7.0	7.9	40.2	A
8.8	56.0	7.4	B	9.0	20.9	5.2	A	8.1	35.7	48.0	B	8.6	43.5	59.2		8.8	11.5	12.5	
7.5	34 4.0	8.0	A	9.0	23.7	35.1		8.9	44.4	34.0		8.7	36 31.7	33.0	A	9.5	33.3	12.4	
8.5	53.9	55.9		7.8	42.1	7.5	A	9.5	50.3	4.3		9.5	47.1	12.7		8.9	48.6	32.8	
9.2	35 5.5	8.4		9.5	48.3	28.8		9.5	55.7	10.6		9.5	54.8	45.5		9.4	50.2	47.6	A
9.5	24.0	52.4		9.4	48.3	1.4		8.8	17 1.9	16.8	A	9.4	57.4	35.4		7.5	59.7	42.7	A
9.5	36 18.3	33.1		9.4	59.5	22.3		9.2	26.4	7.5		8.7	37 7.9	54.4	A	9.1	51 9.8	42.5	A
9.0	37 10.0	10.4		9.5	0 27.0	7.8		7.2	41.8	14.0	A	7.0	26.4	38.7	A	9.3	31.9	47.3	
9.5	12.3	23.3		9.3	43.6	5.4		9.1	55.0	52.6		9.3	38 4.0	23.4		8.2	34.6	13.0	F
9.5	53.4	36.1		6.8	1 7.1	37.6	A	9.5	18 9.6	10.1		9.5	9.6	40.3		8.6	35.7	4.0	F
8.8	38 42.8	48.7	A	9.3	7.7	25.8	A	9.5	11.8	27.1		8.3	43.4	5.8		9.2	43.8	16.8	
9.0	39 25.1	10.5		9.4	58.7	38.2		9.4	15.6	24.1	B	9.5	59.4	40.7		9.5	52 21.9	55.0	
9.2	30.5	5.8		8.7	2 10.1	30.2	A	9.4	31.5	29.7		9.6	39 14.6	17.9		9.4	25.5	58.2	A
9.5	40.2	52.2		8.8	20.8	48.5	A	9.2	58.2	17.2		9.1	18.9	47.1	A	9.4	53 0.5	58.6	
8.7	40 12.9	13.7	A	8.6	29.4	2.2	A	9.3	19 8.0	12.6		9.3	40 4.7	32.4		9.1	3.0	55.2	A
9.4	27.4	14.3		9.2	44.0	11.9		9.4	13.4	19.0		9.1	6.2	53.2	A	9.3	7.2	3.0	B
9.5	49.2	47.5		9.2	48.2	31.0	A	8.8	27.9	58.6		9.5	8.5	38.5		9.5	31.4	34.3	
9.4	41 26.7	34.1		9.2	51.7	48.1		9.2	38.4	30.9		9.2	26.8	45.2	A	9.3	59.6	48.2	
9.0	42 3.3	14.4		8.3	52.8	52.6	A	9.5	49.7	33.4		9.5	34.2	33.6		9.0	54 3.1	0.2	
8.9	29.4	49.5		8.5	3 33.2	19.4	A	8.7	20 12.5	46.6		9.0	41 8.6	39.7		9.3	3.9	48.5	
9.5	43 9.7	16.4		9.4	57.6	5.0		6.5	21 30.0	41.6	A	9.5	15.5	5.0		9.4	5.5	5.8	
9.5	47.8	4.2		9.5	4 4.5	2.0		9.5	22 13.5	57.9		9.4	20.3	41.7		8.5	11.0	15.4	
9.0	44 8.0	12.3		8.5	8.7	29.1	A	9.5	31.2	4.8		8.9	20.4	14.9		9.1	23.6	47.6	B
8.7	35.2	53.2		9.5	11.5	2.9		8.8	49.0	27.0	A	8.8	41.2	57.5	A	9.5	55 1.7	30.5	
9.0	45 3.4	26.3		9.4	48.3	4.3		9.5	23 1.3	15.2		8.7	42 30.0	2.1		9.5	8.0	27.0	
9.1	6.7	17.3	A	7.3	5 0.4	22.7	A	9.4	14.1	30.1	A	8.7	43.4	33.2	A	9.2	11.4	17.4	
9.0	46 12.0	40.5		9.4	11.9	31.2		9.1	26.1	51.8	B	9.0	43 5.8	59.8	A	8.9	27.1	3.2	
9.5	44.0	28.8		9.3	13.2	54.9		9.4	39.4	49.8		8.7	8.6	39.8	A	8.5	56 9.8	34.1	
7.5	47 7.6	5.8	G	9.5	48.3	5.8		9.4	24 49.0	56.7		9.5	33.0	34.9		9.0	17.6	50.3	
6.0	8.2	7.1	S	9.4	6 32.5	8.3		9.5	57.7	58.2		9.1	44.5	29.7	A	8.2	33.5	3.3	
9.2	48 0.3	14.5		9.0	36.3	22.3		9.5	25 18.5	21.1		5.9	48.4	7.9	G	9.0	57 28.5	18.4	
7.2	14.7	31.2	A	9.2	50.2	2.7		9.4	20.7	45.6		9.5	44 9.4	34.3		8.0	39.4	58.9	A
9.2	37.6	0.9		8.8	7 23.6	30.2		9.5	24.1	2.9		9.5	20.6	49.1		9.3	45.0	39.3	
9.2	49 38.4	0.4		9.5	8 2.5	40.0		8.8	47.1	15.6		9.2	33.0	23.7		9.5	45.4	49.8	B
6.2	50 3.1	55.2	A	9.1	25.3	53.2		9.2	49.4	44.0		9.0	50.9	25.7		9.5	56.9	5.0	
9.4	23.8	58.8		9.0	26.1	37.6		9.4	52.3	50.7		9.1	45 49.4	24.3	A	9.1	58 5.4	58.2	A
9.3	55.0	50.0		8.9	9 3.1	6.2		9.5	26 42.0	1.1		9.2	59.4	18.7	A	7.7	17.5	40.6	B
9.5	51 6.8	2.1		9.5	55.5	12.2		7.7	27 47.5	10.7	A	8.2	46 6.4	54.0	A	8.1	19.5	34.4	B
9.2	8.0	3.1	B	9.5	10 2.4	15.2		9.5	28 2.4	0.1		9.5	7.0	33.8		9.4	39.0	0.4	
9.3	13.9	3.3	B	7.8	10.6	5.9	B	6.3	3.5	52.6	A	9.2	28.4	40.1	B	6.6	43.4	55.0	A
8.8	23.3	42.5	A	9.2	24.2	23.5		9.3	9.2	47.1		7.1	36.6	56.5	A	9.5	47.2	22.6	
9.0	36.2	56.8	B	9.1	11 12.1	56.2		9.3	35.5	56.8		7.7	37.7	45.0	A	9.5	48.3	7.4	
9.0	42.6	13.6	A	8.8	31.7	49.3		9.2	29 12.5	28.3		9.5	39.6	40.6		9.5	56.6	27.7	
9.4	44.6	58.2		8.4	38.4	25.9	A	9.5	29.0	28.5		9.3	43.2	9.2		9.5	59 1.0	6.9	
9.5	52 57.0	13.8		7.8	43.9	26.8	A	9.5	37.7	5.0		9.0	46.0	27.9	A	9.5	3.3	2.2	
9.4	57.7	43.1		9.4	52.4	8.4		9.2	48.5	35.0		9.5	47 16.4	23.1		9.5	54.8	36.1	
9.0	53 4.3	1.3	R	9.5	55.4	16.2		9.5	49.3	11.7		9.5	19.1	28.9		8.8	0 13.2	56.2	B
8.8	11.5	53.6	A	9.5	12 21.3	33.0	B	9.5	53.8	54.7		6.8	48 16.7	33.7	A	9.5	14.4	59.7	
8.5	19.0	34.2	A	8.7	50.2	25.1	A	9.2	30 6.5	38.0		9.5	20.4	33.6		9.1	39.9	55.9	B
9.4	20.5	54.3	B	9.1	13 6.3	20.4	B	6.8	11.6	19.2	B	9.4	42.8	53.0		9.4	50.8	13.2	
9.2	33.3	11.6		8.5	14.9	28.1	A	9.4	45.4	10.1		9.4	49 7.2	36.7		9.5	1 2.3	27.8	

2901—2939				2940—2978				2979—3016				3017—3054				3055—3092			
	23ʰ	+55°			23ʰ	+55°			23ʰ	+55°			23ʰ	+55°			23ʰ	+55°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	1 39.7	30.3		9.2	13 6.8	58.9	A	9.4	26 40.0	58.5		9.5	40 3.0	20.3		7.5	49 38.9	2.0	L
9.4	57.8	31.3	B	9.3	33.0	29.6		9.5	47.0	32.5		9.1	16.2	47.9		neb	48.0	54.2	
9.5	2 3.1	56.8		8.2	44.9	0.5	R	9.0	58.0	8.3	A	9.4	53.9	22.1		9.3	50 18.2	3.1	
9.1	7.7	3.0		9.3	14 3.5	19.2	R	9.5	27 5.8	44.4		9.1	41 16.9	9.0	B	8.8	26.3	5.4	
9.0	14.4	14.3		9.2	39.0	8.9		9.4	20.7	59.1		9.1	24.4	17.7		9.5	36.1	39.5	
9.1	26.0	5.8		9.4	50.0	23.9	A	9.4	49.1	20.6		9.2	42.7	2.1	B	9.5	46.5	0.6	
8.7	37.5	12.5		7.8	15 36.5	34.0	A	9.5	28 4.0	43.9		9.4	55.8	55.4		9.2	51.0	2.2	
9.3	39.8	35.8		8.0	38.0	17.2	A	9.5	16.9	0.8		9.4	42 14.0	28.6		9.5	51 25.9	25.1	
9.3	55.9	26.9		9.5	46.6	31.5		8.5	51.0	29.1		9.5	19.4	1.0		9.5	26.8	40.9	
9.5	3 3.1	3.4		9.1	16 30.5	5.4		9.4	58.0	43.4		9.0	23.0	39.4		8.5	45.7	8.8	A
9.4	35.6	58.3		9.5	30.6	51.3		9.3	29 12.5	12.7		9.1	23.1	14.7		9.5	57.9	42.9	
9.5	4 35.2	37.5		9.4	17 4.3	32.0		7.0	30 20.7	5.0	L	8.8	30.6	51.1	B	9.0	52 9.4	56.5	
9.4	41.8	12.3		9.0	15.2	30.8	A	9.5	27.6	53.1		9.5	55.2	38.5		9.5	53 15.3	11.3	
8.3	5 19.3	22.1	A	9.5	28.8	59.5		8.7	31 10.8	9.1		9.0	43 10.5	38.5		9.3	16.8	5.5	
9.3	47.7	33.2	A	8.5	39.0	43.9	A	8.6	52.4	48.5	A	9.5	11.2	30.6		9.5	54 5.1	15.1	
8.8	6 3.0	0.9		9.2	46.4	53.3		9.1	58.6	57.8		9.3	44 7.0	9.1		9.5	42.5	7.4	
8.2	17.5	45.4	A	7.8	18 18.0	19.6	A	9.4	32 1.0	51.3		9.5	8.4	4.0		8.2	51.4	57.4	A
9.2	21.7	52.2	A	9.3	39.5	20.1		9.5	50.6	25.1		9.0	9.9	47.5	R	9.5	55 16.3	10.8	
7.6	31.6	45.0	A	9.4	19 5.6	36.5	A	9.5	33 24.4	47.6		9.2	30.4	45.3	A	9.4	33.8	35.3	
9.3	7 12.4	56.8	A	9.5	20 18.8	6.5	R	9.5	34 12.7	7.3		8.8	37.3	7.4	A	9.5	35.5	55.2	
9.5	40.4	22.3	A	9.0	19.0	38.0	A	9.5	33.0	32.0		9.5	45 48.4	16.2		9.5	56 9.5	2.8	
9.5	50.0	36.5		9.4	30.0	36.5	A	9.1	35 4.3	36.4		8.6	46 5.7	49.8	A	9.5	19.2	46.9	
9.5	8 2.1	13.4		9.3	21 10.6	31.5		9.5	26.8	57.0		9.1	11.6	36.5		9.5	25.4	39.0	
9.4	23.2	2.2	B	9.5	34.0	39.7		9.5	29.5	47.4		9.4	21.1	47.7	B	9.1	40.3	13.3	
8.5	27.7	26.8	A	9.5	47.4	11.7	R	8.3	41.6	37.8	B	7.5	48.2	41.1	A	9.5	55.7	38.7	
8.5	29.4	56.8	A	8.5	22 18.7	55.3	F	8.5	36 29.5	33.5		8.5	47 1.4	10.9		9.4	58.8	35.2	
9.4	30.0	8.0		9.1	41.5	39.8		9.4	46.0	3.1		8.3	40.7	22.4		9.2	57 14.0	16.6	
8.3	42.5	30.0	A	8.8	50.5	46.9		9.1	37 3.2	33.0		8.9	48 6.3	41.1		9.0	29.1	15.0	
7.6	9 25.9	53.3	A	9.5	23 24.7	12.7		9.2	5.4	50.0	B	8.9	9.5	37.9		9.5	33.3	18.4	
9.5	10 3.4	7.0		9.5	51.3	46.9		9.3	6.5	12.2		9.2	27.9	58.9		9.4	58 16.8	41.0	
9.5	4.8	3.3		9.1	55.6	59.4		9.3	9.3	6.8		8.7	55.7	55.4		9.5	58.5	54.1	
9.4	13.7	56.4		9.5	24 37.5	55.5		6.5	45.8	1.1	G	9.2	57.4	22.5	B	9.5	59 6.5	56.0	
8.9	37.3	36.5	R	9.4	52.3	0.3		8.6	46.5	39.9		8.4	49 3.4	12.9		8.0	7.7	42.1	A
9.4	11 25.5	54.0		9.4	25 25.4	55.2		9.5	38 4.5	29.6		9.3	4.7	23.7		8.3	12.3	31.1	A
9.4	40.2	52.3		9.0	52.1	55.8	A	9.5	42.3	30.0		8.4	7.8	10.6		8.5	17.0	46.0	A
9.0	41.5	2.9		9.3	26 9.2	9.1		9.3	49.0	17.2		9.3	13.5	28.2		8.5	34.5	45.5	A
8.5	44.8	27.6	A	8.5	22.7	39.4		9.5	51.0	52.8		9.5	20.9	43.7		9.3	35.8	13.6	
9.5	13 0.0	26.6		9.5	27.6	54.0		9.2	52.7	48.6	R	9.5	25.5	56.0		9.5	56.1	30.9	
9.4	1.5	6.8		9.5	29.4	8.6													

Zone +56°

1—40				41—80				81—120				121—160				161—200			
	0h	+56°			0h	+56°			0h	+56°			0h	+56°			0h	+56°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.5	0 14.6	34.9	R	9.4	12 3.4	42.0		9.5	25 17.4	21.4		9.3	36 17.1	56.5		8.4	49 44.8	26.7	B
8.0	19.5	23.0	A	8.3	4.1	51.7	A	9.3	43.2	35.3		9.3	24.9	4.8	B	9.5	50 2.3	42.8	
9.4	38.0	54.7		9.5	23.2	0.2		8.0	26 7.6	17.1	A	8.0	55.9	46.3	B	9.5	8.1	47.1	
9.2	40.5	35.8		9.5	46.5	16.4		8.5	25.5	44.3	R	9.5	37 12.5	52.0		9.2	30.0	39.3	
9.5	59.4	13.1		9.2	13 23.3	49.4		9.3	27 2.0	9.4		9.2	38 4.7	44.8		9.5	37.3	48.8	
9.0	1 37.5	49.3		8.5	46.2	31.7	A	9.5	12.5	52.8		8.4	13.3	33.3		9.5	45.2	19.5	
9.1	53.3	6.5		9.4	14 54.9	18.9		8.8	21.4	24.4		8.8	56.3	3.7	R	9.5	54.2	18.5	
9.0	56.7	39.3		9.5	15 5.7	31.8		9.3	57.6	38.8		8.5	39 27.7	45.8		9.0	58.0	8.6	A
9.0	2 7.1	9.9		9.4	7.4	53.1		9.5	28 0.0	28.0		9.3	53.6	59.7		9.5	51 5.9	53.3	
9.3	9.0	27.4	A	9.5	15.2	39.1		9.3	4.4	41.8		8.7	40 45.0	32.1	B	9.5	22.3	59.1	
6.7	53.6	21.4	A	7.7	16 16.7	17.6	B	7.4	7.4	30.5	B	7.3	50.8	17.0	B	9.3	24.8	15.3	R
8.8	3 10.1	28.9	A	7.5	27.0	51.8	B	9.4	35.9	45.8		9.5	41 1.1	36.3		9.5	52 13.5	52.2	
7.7	18.2	10.0	B	8.7	34.8	9.4	J	9.5	37.5	47.8		9.3	22.7	48.8		8.7	31.0	38.9	
6.8	28.2	48.7	R	8.0	40.2	10.7	J	9.5	52.4	5.1		9.0	29.7	25.4		9.4	50.0	19.9	
8.3	56.6	20.9	A	9.5	17 10.4	58.2		9.1	29 31.5	39.1		9.0	31.5	30.8		8.8	53 5.4	59.3	
7.3	4 10.5	27.9	A	9.5	16.3	19.8		8.8	34.4	32.0		8.7	57.2	16.9		9.5	29.0	15.5	
9.1	22.1	33.3		9.5	22.5	30.0		9.3	43.7	52.2		9.4	42 3.0	36.3		9.5	31.3	44.9	
9.2	34.6	25.4	A	9.5	31.0	25.7		9.0	30 2.6	45.7		9.0	47.6	51.4		9.5	54 16.1	26.5	
7.8	5 8.5	26.4	A	9.5	53.8	14.0		8.7	5.9	49.7	B	9.4	43 5.2	17.4		9.3	17.1	9.6	
8.8	11.7	8.5		9.5	18 48.0	40.8		9.4	16.5	30.2		9.0	37.3	7.0		8.8	44.8	48.4	
9.4	18.4	56.2		8.8	50.7	28.9		7.6	25.0	43.1	B	8.9	45.3	51.7		9.5	56.1	8.6	
9.5	33.0	53.1		9.0	20 15.2	6.0		9.0	31 11.3	2.0		8.5	44 12.3	50.7		9.4	55 18.3	46.1	
9.5	35.4	23.9		9.0	34.7	21.3	B	9.5	12.5	37.5		7.4	37.2	25.9	A	7.4	33.2	19.9	L
9.5	58.0	4.5		9.3	43.9	10.8		9.5	26.7	35.5		7.4	45 35.5	12.9	A	9.4	34.7	51.0	
9.3	6 8.6	6.0		7.1	57.2	24.9	A	9.5	35.4	20.4		9.2	46 0.7	46.8		9.3	51.5	21.2	
9.4	44.7	5.0		8.0	21 26.7	8.6	B	9.5	53.0	56.4		9.4	27.0	12.4		8.5	56 3.4	3.6	A
9.0	58.5	6.5		7.2	48.9	13.6	A	9.4	32 37.7	54.5		9.0	30.7	7.8		9.4	27.0	28.0	
9.4	7 14.0	31.4		9.0	59.4	28.9		8.0	51.8	21.4	A	9.3	37.9	26.0		9.5	40.9	47.9	
9.0	8 13.9	18.4		8.0	22 27.9	27.9	A	9.0	33 5.8	24.8	A	7.5	38.4	29.1	A	9.5	51.4	22.3	
9.4	32.8	1.3		7.2	47.3	16.8	A	9.5	53.4	33.8		9.5	47 6.9	27.3		9.5	58.2	35.2	
7.2	9 22.8	6.2	A	7.0	23 4.2	33.7	A	9.2	34 9.7	31.8		7.3	57.3	29.7	A	7.0	57 18.9	58.7	A
8.8	29.4	47.3	A	7.8	14.4	26.9	A	7.8	23.8	47.9	A	9.5	48 12.6	58.2		9.5	20.5	55.9	
9.5	57.6	21.9		9.5	33.0	33.3		9.4	37.7	54.3	B	9.5	14.7	36.9		9.0	36.4	50.8	A
9.0	10 3.1	45.8	A	8.5	43.1	6.3		9.4	38.9	50.5		9.5	15.2	25.0		9.5	42.0	47.5	
9.4	28.6	36.8		8.4	24 4.2	17.4		9.4	47.3	56.3		9.4	25.1	50.3		8.2	58 6.8	19.1	A
9.5	36.5	35.8		8.9	17.5	46.1	B	9.3	51.2	12.4		7.9	26.5	42.5	A	6.6	14.7	9.2	A
8.5	40.0	39.9	A	9.3	38.9	0.4		9.4	52.2	26.4	A	9.0	36.4	52.5	A	9.1	44.5	8.5	
9.5	11 4.3	25.4		7.5	50.2	22.9	A	9.0	35 18.4	10.2		9.1	49 6.7	2.3		9.5	59.2	34.8	
9.5	24.7	50.9		8.5	53.5	52.1		9.1	21.4	16.8	B	9.5	30.9	45.3		9.5	59 7.9	57.4	
9.5	55.0	10.1		9.0	56.5	36.6		9.3	44.0	7.8		8.5	43.8	12.2	R	9.4	56.8	24.0	

201—260				261—320				321—380				381—440				441—500			
	1ᵘ	+56°			1ᵘ	+56°			1ᵘ	+56°			1ᵘ—2ᵘ	+56°			2ᵘ	+56°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	0 7.1	1.3		9.5	15 5.4	36.5		8.2	32 52.1	27.2	R	9.4	44 7.6	44.3		9.2	1 40.9	35.1	
9.5	8.0	26.5		9.5	10.6	36.7		9.2	57.6	43.5		8.8	13.6	49.1	A	9.5	59.2	51.6	
9.5	24.9	43.1		9.5	10.6	35.9		9.4	33 14.0	48.4		9.5	26.5	17.0		8.9	2 3.7	37.5	A
8.9	25.3	55.9	A	7.7	18.9	26.3	L	9.0	20.1	55.9		9.5	45 8.2	4.8		9.0	7.6	13.9	
9.5	27.8	40.3		8.8	26.0	31.9	B	9.1	30.4	32.2	R	7.6	33.5	18.6	L	9.1	27.8	37.1	A
9.5	42.3	1.4		9.0	28.8	32.8		9.5	42.1	34.1		7.4	35.5	22.7	L	8.8	44.5	32.3	A
6.7	47.8	34.6	A	9.5	29.5	17.2		9.5	58.8	48.2	B	9.4	46 3.4	51.2		9.5	47.8	0.9	
9.4	55.2	17.3		9.5	47.1	34.6		8.7	34 34.4	5.3		9.5	43.1	47.9		9.5	48.2	40.8	
9.0	1 12.3	43.5	B	8.6	16 13.1	52.7	R	9.5	36.0	7.3		9.2	51.3	16.6	A	7.0	48.5	31.7	A
9.1	25.1	24.0		9.5	17.8	45.3		6.4	45.2	48.3	B	9.1	59.4	4.7		9.5	3 12.1	41.4	
8.5	54.7	55.5	A	8.9	54.4	46.3	R	9.5	56.8	1.4		9.3	47 3.8	34.6		9.3	35.4	50.1	
9.5	55.2	54.9		9.5	17 17.3	17.9		9.3	58.6	50.3		9.4	4.6	52.6		9.2	39.8	49.9	
9.2	2 33.3	49.4	B	9.1	40.9	40.8		9.5	35 2.0	58.3	B	9.5	20.5	44.0		9.5	51.8	48.8	
9.4	41.6	46.1		8.9	46.9	37.8	R	6.5	15.6	21.5	B	9.5	48.4	1.0		9.5	53.7	59.3	
9.1	46.3	1.9	A	8.9	53.3	4.4	B	9.5	15.9	58.3		9.3	48 3.3	44.6		9.5	4 32.5	4.6	
9.2	47.8	48.9		8.1	53.6	58.0	B	8.8	17.2	23.8		8.8	29.2	12.1	A	9.5	39.9	31.0	
9.5	59.6	23.9		8.9	58.4	44.0		9.2	28.1	27.9		9.0	49 0.1	34.0		9.5	46.2	10.5	
9.5	3 8.9	30.1		8.9	18 6.5	46.1		9.2	29.0	23.2		9.5	7.9	3.0		9.0	46.5	59.7	A
9.5	21.7	33.3		8.5	15.8	36.8	A	9.5	41.8	54.0		9.5	22.8	50.1		9.5	46.7	11.6	
9.5	57.6	30.4		8.7	50.9	32.5		9.1	43.0	8.2	R	9.5	50.7	33.1		9.3	53.5	32.0	
8.5	4 7.0	25.0	A	9.4	19 4.9	22.4	R	9.4	45.9	51.4		9.5	59.9	30.0		9.0	55.6	54.3	A
9.5	14.8	19.7		9.5	33.8	24.3	R	8.7	36 6.1	26.8	A	9.5	50 27.3	45.6		8.8	5 3.0	14.6	
8.0	20.9	49.3	A	9.5	54.8	1.7		9.0	7.6	59.1		9.4	51 2.6	15.8		9.5	14.2	19.2	
8.8	23.7	32.9		9.5	20 18.9	36.2		9.2	10.1	32.4	B	9.5	21.0	4.8		9.5	40.0	44.6	
9.1	51.5	3.7		9.4	21 17.8	46.7		9.5	10.3	57.9		9.3	42.8	50.8		9.5	6 3.1	57.0	
9.5	5 1.5	21.2		9.3	30.7	3.1		9.3	12.0	28.2	A	9.2	49.4	43.0	A	9.2	3.4	56.5	
9.5	6 6.9	13.8		9.3	33.8	56.1		9.0	14.1	9.4	R	9.5	52 20.0	40.5		9.5	20.2	51.4	
9.5	19.6	9.1		9.5	22 10.7	38.7		9.5	52.4	58.9		9.5	51.4	25.2		9.5	26.3	21.6	
9.5	22.6	36.0		9.5	45.7	26.8	R	9.5	37 12.4	58.4		8.6	54.5	36.3	R	8.5	35.2	3.6	B
9.5	32.6	54.0		9.3	50.6	12.1	R	9.2	26.1	59.2	A	9.1	53 5.4	57.8	A	7.0	41.3	21.1	G
8.5	39.6	23.4		9.1	23 9.3	2.3	R	9.5	33.9	13.9		9.5	33.2	28.7		6.6	45.7	22.7	G
8.2	42.0	56.4	A	9.5	31.7	26.9	R	9.5	38 11.8	50.1		9.4	46.6	57.6	A	9.3	46.5	11.6	
9.5	7 23.5	15.4		9.3	49.2	43.5		8.8	36.7	53.4	A	9.5	54 0.6	47.1		8.7	51.1	27.2	
8.5	47.4	20.7	A	9.1	24 3.7	45.7	R	9.3	45.1	19.1	B	9.5	6.6	42.3		9.5	52.5	40.1	
9.4	8 4.8	44.9		8.0	28.7	4.1	R	9.1	39 4.8	51.9	A	9.5	10.5	40.3		7.7	53.5	2.5	B
9.1	13.4	22.3		9.4	25 14.3	1.8		9.5	29.2	46.2		8.7	48.4	23.4	A	9.5	53.8	25.3	
8.5	17.4	19.7	A	9.5	14.6	35.6		8.8	55.9	1.5	B	8.8	56.6	18.7	A	9.5	56.8	17.6	
8.9	22.6	58.6		9.5	54.8	26.0		9.5	40 10.1	10.4		9.0	55 0.4	3.9		8.8	7 3.4	5.6	
9.4	24.5	7.4		9.5	58.5	14.7		9.1	55.8	49.4	A	9.5	9.0	55.8		8.9	10.1	13.3	
7.6	26.7	52.0	A	8.4	26 50.4	44.4		7.9	41 9.6	2.6	B	9.5	29.5	14.7		8.2	19.1	41.4	J
9.4	52.4	47.3		8.4	27 3.5	54.5	R	9.1	20.9	15.1		9.4	34.5	14.5	B	9.4	28.1	24.6	
9.0	9 11.3	31.3	A	8.5	29.4	17.7	R	9.5	22.4	47.8		9.5	56 3.7	17.1		8.9	31.6	31.4	
8.9	11.8	56.1	A	9.5	28 23.6	37.6		9.5	29.3	19.3		9.2	13.5	24.6	A	9.2	37.7	43.6	
9.5	15.0	58.8		9.4	32.4	41.2		9.5	49.5	32.6		8.0	21.5	36.6	A	9.1	38.6	13.5	
8.0	10 23.6	30.2	A	9.4	56.4	34.7		9.5	56.1	50.5		8.7	33.6	21.0	A	8.7	42.5	24.9	
8.9	26.4	34.9	A	9.5	29 17.0	5.0		9.5	58.7	9.4		9.5	57 42.4	54.4		6.5	54.2	50.7	G
9.5	49.3	6.2		8.2	19.3	39.7	L	9.2	59.2	53.1	A	8.9	47.1	7.9	A	9.2	8 3.0	49.0	
9.4	11 24.5	54.3	A	9.2	23.2	8.7	R	9.5	42 23.7	19.3		8.0	53.9	20.0	B	9.4	3.2	41.2	
9.1	26.0	5.9		9.5	45.9	5.4		9.4	43.0	22.0		8.3	56.9	24.6	A	9.3	6.9	29.8	
9.5	38.9	51.2		8.5	30 5.3	25.0	R	9.5	50.8	19.6		9.5	58 16.9	21.1		9.5	7.3	2.7	
9.5	47.5	40.6		9.4	10.6	58.4		9.5	54.2	18.5	B	8.2	59 3.6	21.0	A	9.5	8.6	32.1	
9.5	49.3	58.0		9.5	31.8	48.3		8.0	59.6	34.0	A	8.0	28.3	18.3	A	9.5	9.5	33.7	
9.3	59.2	9.2		9.4	31 6.3	14.5	B	9.5	43 0.6	33.7		8.9	39.9	1.1	A	9.3	12.6	10.9	
9.5	12 6.7	51.3		9.2	8.0	43.7		9.5	3.5	1.1		9.4	50.6	0.4		9.5	13.0	12.9	
9.5	18.6	11.6		9.1	19.5	31.0		9.0	7.6	33.8	A	9.4	0 9.8	41.3		9.5	13.3	22.6	
9.5	21.1	14.1		9.5	54.2	13.7		9.4	12.0	20.7		9.5	13.1	29.8		9.5	15.2	42.4	
9.5	13 8.7	19.1		9.5	32 9.2	49.1		9.4	13.8	53.5		9.5	46.4	31.0		8.9	15.3	21.9	
9.5	14 5.8	28.5		8.9	10.2	50.8		8.5	45.0	30.8	A	6.5	1 25.5	57.5	B	8.6	15.6	20.1	
9.5	12.1	53.2		9.5	33.5	45.6		9.0	51.3	12.8		9.5	33.0	5.9		9.3	19.2	53.3	
9.5	35.6	52.6		9.4	33.5	27.8		9.5	44 3.8	28.0		9.5	38.2	29.3		8.5	19.4	32.0	R

Zone +56°

1—40				41—80				81—120				121—160				161—200			
	0h		+56°		0h		+56°		0h		+56°		0h		+56°		0h		+56°	
m	′	″	′		m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	
8.5	0	14.6	34.9	R	9.4	12	3.4	42.0	9.5	25	17.4	21.4	9.3	36	17.1	56.5	8.4	49	44.8	26.7	B
8.0		19.5	23.0	A	8.3		4.1	51.7	A	9.3		43.2	35.3	9.3		24.9	4.8	B	9.5	50	2.3	42.8
9.4		38.0	54.7		9.5		23.2	0.2		8.0	26	7.6	17.1	A	8.0		55.9	46.3	B	9.5		8.1	47.1
9.2		40.5	35.8		9.5		46.5	16.4		8.5		25.5	44.3	R	9.5	37	12.5	52.0		9.2		30.0	39.3
9.5		59.4	13.1		9.2	13	23.3	49.4		9.3	27	2.0	9.4		9.2	38	4.7	44.8		9.5		37.3	48.8
9.0	1	37.5	49.3		8.5		46.2	31.7	A	9.5		12.5	52.8		8.4		13.3	33.3		9.5		45.2	19.5
9.1		53.3	6.5		9.4	14	54.9	18.9		8.8		21.4	24.4		8.8		56.3	3.7	R	9.5		54.2	18.5
9.0		56.7	39.3		9.5	15	5.7	31.8		9.3		57.6	38.8		8.5	39	27.7	45.8		9.0		58.0	8.6	A
9.0	2	7.1	9.9		9.4		7.4	53.1		9.5	28	0.0	28.0		9.3		53.6	59.7		9.5	51	5.9	53.3
9.3		9.0	27.4	A	9.5		15.2	39.1		9.3		4.4	41.8		8.7	40	45.0	32.1	B	9.5		22.3	59.1	
6.7		53.6	21.4	A	7.7	16	16.7	17.6	B	7.4		7.4	30.5	B	7.3		50.8	17.0	B	9.3		24.8	15.3	R
8.8	3	10.1	28.9	A	7.5		27.0	51.8	B	9.4		35.9	45.8		9.5	41	1.1	36.3		9.5	52	13.5	52.2
7.7		18.2	10.0	B	8.7		34.8	9.4	J	9.5		37.5	47.8		9.3		22.7	48.8		8.7		31.0	38.9
6.8		28.2	48.7	R	8.0		40.2	10.7	J	9.5		52.4	5.1		9.0		29.7	25.4		9.4		50.0	19.9
8.3		56.6	20.9	A	9.5	17	10.4	58.2		9.1	29	31.5	39.1		9.0		31.5	30.8		8.8	53	5.4	59.3
7.3	4	10.5	27.9	A	9.5		16.3	19.8		8.8		34.4	32.0		8.7		57.2	16.9		9.5		29.0	15.5
9.1		22.1	33.3		9.5		22.5	30.0		9.3		43.7	52.2		9.4	42	3.0	36.3		9.5		31.3	44.9
9.2		34.6	25.4	A	9.5		31.0	25.7		9.0	30	2.6	45.7		9.0		47.6	51.4		9.5	54	16.1	26.5
7.8	5	8.5	26.4	A	9.5		53.8	14.0		8.7		5.9	49.7	B	9.4	43	5.2	17.4		9.3		17.1	9.6
8.8		11.7	8.5		9.5	18	48.0	40.8		9.4		16.5	30.2		9.0		37.3	7.0		8.8		44.8	48.4
9.4		18.4	56.2		8.8		50.7	28.9		7.6		25.0	43.1	B	8.9		45.3	51.7		9.5		56.1	8.6
9.5		33.0	53.1		9.0	20	15.2	6.0		9.0	31	11.3	2.0		8.5	44	12.3	50.7		9.4	55	18.3	46.1
9.5		35.4	23.9		9.0		34.7	21.3	B	9.5		12.5	37.5		7.4		37.2	25.9	A	7.4		33.2	19.9	L
9.5		58.0	4.5		9.3		43.9	10.8		9.5		26.7	35.5		7.4	45	35.5	12.9	A	9.4		34.7	51.0	
9.3	6	8.6	6.0		7.1		57.2	24.9	A	9.5		35.4	20.4		9.2	46	0.7	46.8		9.3		51.5	21.2	
9.4		44.7	5.0		8.0	21	26.7	8.6	B	9.5		53.0	56.4		9.4		27.0	12.4		8.5	56	3.4	3.6	A
9.0		58.5	6.5		7.2		48.9	13.6	A	9.4	32	37.7	54.5		9.0		30.7	7.8		9.4		27.0	28.0	
9.4	7	14.0	31.4		9.0		59.4	28.9		8.0		51.8	21.4	A	9.3		37.9	26.0		9.5		40.9	47.9	
9.0	8	13.9	18.4		8.0	22	27.9	27.9	A	9.0	33	5.8	24.8	A	7.5		38.4	29.1	A	9.5		51.4	22.3	
9.4		32.8	1.3		7.2		47.3	16.8	A	9.5		53.4	33.8		9.5	47	6.9	27.3		9.5		58.2	35.2	
7.2	9	22.8	6.2	A	7.0	23	4.2	33.7	A	9.2	34	9.7	31.8		7.3		57.3	29.7	A	7.0	57	18.9	58.7	A
8.8		29.4	47.3	A	7.8		14.4	26.9	A	7.8		23.8	47.9	A	9.5	48	12.6	58.2		9.5		20.5	55.9	
9.5		57.6	21.9		9.5		33.0	33.3		9.4		37.7	54.3	B	9.5		14.7	36.9		9.0		36.4	50.8	A
9.0	10	3.1	45.8	A	8.5		43.1	6.3		9.4		38.9	50.5		9.5		15.2	25.0		9.5		42.0	47.5	
9.4		28.6	36.8		8.4	24	4.2	17.4		9.4		47.3	56.3		9.4		25.1	50.3		8.2	58	6.8	19.1	A
9.5		36.5	35.8		8.9		17.5	46.1	B	9.3		51.2	12.4		7.9		26.5	42.5	A	6.6		14.7	9.2	A
8.5		40.0	39.9	A	9.3		38.9	0.4		9.4		52.2	26.4	A	9.0		36.4	52.5	A	9.1		44.5	8.5	
9.5	11	4.3	25.4		7.5		50.2	22.9	A	9.0	35	18.4	10.2		9.1	49	6.7	2.3		9.5		59.2	34.8	
9.5		24.7	50.9		8.5		53.5	52.1		9.1		21.4	16.8	B	9.5		30.9	45.3		9.5	59	7.9	57.4	
9.5		55.0	10.1		9.0		56.5	36.6		9.3		44.0	7.8		8.5		43.8	12.2	R	9.4		56.8	24.0	

201—260				261—320				321—380				381—440				441—500			
	1ᵘ		+56°		1ᵘ		+56°		1ᵘ		+56°		1ᵘ—2ᵘ		+56°		2ᵘ		+56°
m	′	″	′		m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	
9.5	0	7.1	1.3		9.5	15	5.4	36.5	8.2	32	52.1	27.2	R	9.4	44	7.6	44.3	9.2	1	40.9	35.1	
9.5		8.0	26.5		9.5		10.6	36.7	9.2		57.6	43.5		8.8		13.6	49.1	A	9.5		59.2	51.6	
9.5		24.9	43.1		9.5		10.6	35.9	9.4	33	14.0	48.4		9.5		26.5	17.0		8.9	2	3.7	37.5	A
8.9		25.3	55.9	A	7.7		18.9	26.3	L	9.0		20.1	55.9		9.5	45	8.2	4.8		9.0		7.6	13.9	
9.5		27.8	40.3		8.8		26.0	31.9	B	9.1		30.4	32.2	R	7.6		33.5	18.6	L	9.1		27.8	37.1	A
9.5		42.3	1.4		9.0		28.8	32.8		9.5		42.1	34.1		7.4		35.5	22.7	L	8.8		44.5	32.3	A
6.7		47.8	34.6	A	9.5		29.5	17.2		9.5		58.8	48.2	B	9.4	46	3.4	51.2		9.5		47.8	0.9	
9.4		55.2	17.3		9.5		47.1	34.6		8.7	34	34.4	5.3		9.5		43.1	47.9		9.5		48.2	40.8	
9.0	1	12.3	43.5	B	8.6	16	13.1	52.7	R	9.5		36.0	7.3		9.2		51.3	16.6	A	7.0		48.5	31.7	A
9.1		25.1	24.0		9.5		17.8	45.3		6.4		45.2	48.3	B	9.1		59.4	4.7		9.5	3	12.1	41.4	
8.5		54.7	55.5	A	8.9		54.4	46.3	R	9.5		56.8	1.4		9.3	47	3.8	34.6		9.3		35.4	50.1	
9.5		55.2	54.9		9.5	17	17.3	17.9		9.3		58.6	50.3		9.4		4.6	52.6		9.2		39.8	49.9	
9.2	2	33.3	49.4	B	9.1		40.9	40.8		9.5	35	2.0	58.3	B	9.5		20.5	44.0		9.5		51.8	48.8	
9.4		41.6	46.1		8.9		46.9	37.8	R	6.5		15.6	21.5	B	9.5		48.4	1.0		9.5		53.7	59.3	
9.1		46.3	1.9	A	8.9		53.3	4.4	B	9.5		15.9	58.3		9.3	48	3.3	44.6		9.5	4	32.5	4.6	
9.2		47.8	48.9		8.1		53.6	58.0	B	8.8		17.2	23.8		8.8		29.2	12.1	A	9.5		39.9	31.0	
9.5		59.6	23.9		8.9		58.4	44.0		9.2		28.1	27.9		9.0	49	0.1	34.0		9.5		46.2	10.5	
9.5	3	8.9	30.1		8.9	18	6.5	46.1		9.2		29.0	23.2		9.5		7.9	3.0		9.0		46.5	59.7	A
9.5		21.7	33.3		8.5		15.8	36.8	A	9.5		41.8	54.0		9.5		22.8	50.1		9.5		46.7	11.6	
9.5		57.6	30.4		8.7		50.9	32.5		9.1		43.0	8.2	R	9.5		50.7	33.1		9.3		53.5	32.0	
8.5	4	7.0	25.0	A	9.4	19	4.9	22.4	R	9.4		45.9	51.4		9.5		59.9	30.0		9.0		55.6	54.3	A
9.5		14.8	19.7		9.5		33.8	24.3	R	8.7	36	6.1	26.8	A	9.5	50	27.3	45.6		8.8	5	3.0	14.6	
8.0		20.9	49.3	A	9.5		54.8	1.7		9.0		7.6	59.1		9.4	51	2.6	15.8		9.5		14.2	19.2	
8.8		23.7	32.9		9.5	20	18.9	36.2		9.2		10.1	32.4	B	9.5		21.0	4.8		9.5		40.0	44.6	
9.1		51.5	3.7		9.4	21	17.8	46.7		9.5		10.3	57.9		9.3		42.8	50.8		9.5	6	3.1	57.0	
9.5	5	1.5	21.2		9.3		30.7	3.1		9.3		12.0	28.2	A	9.2		49.4	43.0	A	9.2		3.4	56.5	
9.5	6	6.9	13.8		9.3		33.8	56.1		9.0		14.1	9.4	R	9.5	52	20.0	40.5		9.5		20.2	51.4	
9.5		19.6	9.1		9.5	22	10.7	38.7		9.5		52.4	58.9		9.5		51.4	25.2		9.5		26.3	21.6	
9.5		22.6	36.0		9.5		45.7	26.8	R	9.5	37	12.4	58.4		8.6		54.5	36.3	R	8.5		35.2	3.6	B
9.5		32.6	54.0		9.3		50.6	12.1	R	9.2		26.1	59.2	A	9.1	53	5.4	57.8	A	7.0		41.3	21.1	G
8.5		39.6	23.4		9.1	23	9.3	2.3	R	9.5		33.9	13.9		9.5		33.2	28.7		6.6		45.7	22.7	G
8.2		42.0	56.4	A	9.5		31.7	26.9	R	9.5	38	11.8	50.1		9.4		46.6	57.6	A	9.3		46.5	11.6	
9.5	7	23.5	15.4		9.3		49.2	43.5		8.8		36.7	53.4	A	9.5	54	0.6	47.1		8.7		51.1	27.2	
8.5		47.4	20.7	A	9.1	24	3.7	45.7	R	9.3		45.1	19.1	B	9.5		6.6	42.3		9.5		52.5	40.1	
9.4	8	4.8	44.9		8.0		28.7	4.1	R	9.1	39	4.8	51.9	A	9.5		10.5	40.3		7.7		53.5	2.5	B
9.1		13.4	22.3		9.4	25	14.3	1.8		9.5		29.2	46.2		8.7		48.4	23.4	A	9.5		53.8	25.3	
8.5		17.4	19.7	A	9.5		14.6	35.6		8.8		55.9	1.5	B	8.8		56.6	18.7	A	9.5		56.8	17.6	
8.9		22.6	58.6		9.5		54.8	26.0		9.5	40	10.1	10.4		9.0	55	0.4	3.9		8.8	7	3.4	5.6	
9.4		24.5	7.4		9.5		58.5	14.7		9.1		55.8	49.4	A	9.5		9.0	55.8		8.9		10.1	13.3	
7.6		26.7	52.0	A	8.4	26	50.4	44.4		7.9	41	9.6	2.6	B	9.5		29.5	14.7		8.2		19.1	41.4	J
9.4		52.4	47.3		8.4	27	3.5	54.5	R	9.1		20.9	15.1		9.4		34.5	14.5	B	9.4		28.1	24.6	
9.0	9	11.3	31.3	A	8.5		29.4	17.7	R	9.5		22.4	47.8		9.5	56	3.7	17.1		8.9		31.6	31.4	
8.9		11.8	56.1	A	9.5	28	23.6	37.6		9.5		29.3	19.3		9.2		13.5	24.6	A	9.2		37.7	43.6	
9.5		15.0	58.8		9.4		32.4	41.2		9.5		49.5	32.6		8.0		21.5	36.6	A	9.1		38.6	13.5	
8.0	10	23.6	30.2	A	9.4		56.4	34.7		9.5		56.1	50.5		8.7		33.6	21.0	A	8.7		42.5	24.9	
8.9		26.4	34.9	A	9.5	29	17.0	5.0		9.5		58.7	9.4		9.5	57	42.4	54.4		6.5		54.2	50.7	G
9.5		49.3	6.2		8.2		19.3	39.7	L	9.2		59.2	53.1	A	8.9		47.1	7.9	A	9.2	8	3.0	49.0	
9.4	11	24.5	54.3	A	9.2		23.2	8.7	R	9.5	42	23.7	19.3		8.0		53.9	20.0	B	9.4		3.2	41.2	
9.1		26.0	5.9		9.5		45.9	5.4		9.4		43.0	22.0		8.3		56.9	24.6	A	9.3		6.9	29.8	
9.5		38.9	51.2		8.5	30	5.3	25.0	R	9.5		50.8	19.6		9.5	58	16.9	21.1		9.5		7.3	2.7	
9.5		47.5	40.6		9.4		10.6	58.4		9.5		54.2	18.5	B	8.2	59	3.6	21.0	A	9.5		8.6	32.1	
9.5		49.3	58.0		9.5		31.8	48.3		8.0		59.6	34.0	A	8.0		28.3	18.3	A	9.5		9.5	33.7	
9.3		59.2	9.2		9.4	31	6.3	14.5	B	9.5	43	0.6	33.7		8.9		39.9	1.1	A	9.3		12.6	10.9	
9.5	12	6.7	51.3		9.2		8.0	43.7		9.5		3.5	1.1		9.4		50.6	0.4		9.5		13.0	12.9	
9.5		18.6	11.6		9.1		19.5	31.0		9.0		7.6	33.8	A	9.4	0	9.8	41.3		9.5		13.3	22.6	
9.5		21.1	14.1		9.5		54.2	13.7		9.4		12.0	20.7		9.5		13.1	29.8		9.5		15.2	42.4	
9.5	13	8.7	19.1		9.5	32	9.2	49.1		9.4		13.8	53.5		9.5		46.4	31.0		8.9		15.3	21.9	
9.5	14	5.8	28.5		8.9		10.2	50.8		8.5		45.0	30.8	A	6.5	1	25.5	57.5	B	8.6		15.6	20.1	
9.5		12.1	53.2		9.5		33.5	45.6		9.0		51.3	12.8		9.5		33.0	5.9		9.3		19.2	53.3	
9.5		35.6	52.6		9.4		33.5	27.8		9.5	44	3.8	28.0		9.5		38.2	29.3		8.5		19.4	32.0	R

501—560				561—620				621—680				681—740				741—800			
	2u	+56°			2u	+56°			2u	+56°			2u	+56°			2u—3u	+56°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	8 20.5	28.4	A	9.5	11 22.0	37.7		7.0	16 2.3	34.6	A	9.5	28 53.2	36.4		9.5	44 5.3	12.1	
9.1	23.9	32.2		9.4	29.9	38.2		9.3	10.7	14.9		8.5	30 5.6	13.2	A	9.5	6.3	18.8	
9.5	26.5	12.4		9.3	31.2	27.3		9.5	14.6	9.9		7.0	7.0	40.6	A	9.5	12.6	43.6	
9.0	32.0	25.6		9.5	34.0	17.8		9.3	23.7	25.6		9.5	27.5	51.4		9.2	45 10.4	4.4	
9.5	34.6	23.9		9.1	36.8	43.2		9.5	35.8	35.0		8.6	29.1	53.0	B	9.4	13.6	56.1	B
9.5	35.0	53.4		9.4	40.1	29.8		9.5	39.2	10.4		9.1	42.7	6.5		9.5	49.4	18.2	
9.2	35.4	5.2		8.4	42.1	14.2		9.1	58.0	3.2	B	9.5	55.2	3.7		9.0	46 23.4	24.6	
9.2	38.4	36.7		6.7	42.2	34.4	L	9.4	17 7.6	4.3		9.5	31 13.8	38.4		9.5	24.8	51.5	
9.2	39.0	34.0		9.5	44.4	2.7		9.5	21.7	32.5		8.0	14.4	49.7	A	9.2	47 5.7	58.9	
9.3	39.2	27.7		8.5	48.4	28.6	L	8.2	51.2	37.1	A	8.2	31.8	47.6	A	9.5	41.6	57.2	
8.8	39.7	23.6		9.1	48.7	28.0		9.0	18 1.3	34.5	A	9.5	47.9	7.9		9.3	50.4	22.4	B
9.0	39.9	45.2		9.3	50.8	28.1		8.4	19 2.1	26.2	A	9.5	32 10.9	55.6		9.5	48 25.8	43.0	
9.2	41.0	25.4		9.4	53.0	25.2		9.5	20.9	55.6		8.3	19.8	16.5	A	9.5	42.4	26.8	
9.5	44.3	24.7		8.7	56.0	26.5		9.5	27.8	7.3		9.4	37.0	32.6	B	9.5	49.7	28.9	
9.2	45.0	28.0		9.1	56.7	27.4		8.4	40.2	35.6	A	9.3	37.1	5.5		8.8	53.5	17.6	
9.5	45.4	29.1		9.1	57.5	26.7		9.5	41.7	36.2		9.4	57.3	32.9		9.5	49 2.1	6.4	
9.5	46.9	28.7		8.9	12 3.4	36.5	J	8.1	47.3	1.1	A	9.5	59.8	33.3		9.5	17.7	42.7	
9.5	50.0	29.0		9.0	5.0	27.3		9.4	58.8	58.9		9.5	33 6.2	35.3		9.5	47.8	6.9	
9.4	50.0	28.3		9.5	5.1	58.4		9.5	20 25.1	17.8		9.5	10.7	51.2		9.2	53.0	24.6	
9.4	51.3	28.3		9.5	5.3	31.0		9.5	42.2	52.7		9.5	17.8	24.2		9.5	50 50.0	22.8	
9.4	52.6	30.3		9.5	7.3	30.7		9.3	44.3	11.5		9.2	28.4	3.1	B	8.7	50.0	45.0	
6.8	55.3	27.7	B	9.3	7.9	37.1		8.6	58.8	15.0		8.2	36.9	29.1	A	9.5	51 15.7	14.7	
9.5	55.8	17.1		8.6	11.8	26.3		9.5	21 14.9	34.9		8.9	40.8	1.8	A	9.5	28.2	7.8	
9.4	57.5	27.2		9.2	16.0	32.2		7.0	25.8	52.9	L	9.5	43.8	3.7		9.4	52 4.9	46.1	
9.4	9 0.2	27.7		9.5	16.8	49.6		9.4	38.3	3.5		9.1	44.3	26.1	S	9.4	53 40.0	35.7	
8.7	1.3	27.2		9.4	23.6	24.4		9.3	40.8	2.7		9.2	34 3.8	5.9	A	9.5	54 38.2	37.4	
8.4	1.4	27.4		9.5	26.5	36.9		8.8	46.3	1.2		9.4	6.2	57.7		5.0	42.9	8.1	A
9.3	2.3	21.1		9.0	30.4	25.4		8.0	22 0.1	47.0		8.2	28.9	30.8	A	9.4	53.7	3.7	
9.3	4.6	27.3		9.1	33.0	50.6		9.4	6.8	2.9		9.1	52.6	50.3		8.9	59.5	8.1	A
6.7	4.6	29.8	B	9.5	34.8	29.3		9.5	8.6	50.4		9.5	35 27.5	26.5		9.0	55 7.4	13.0	
9.5	7.7	34.6		7.5	39.9	34.5	L	9.1	24.7	10.1		9.2	34.9	12.7		7.7	19.9	56.1	A
9.5	15.2	20.0		9.4	44.5	20.5		8.5	25.8	53.1		9.5	36 22.8	2.1		8.6	23.8	19.0	
9.5	17.0	26.5		7.0	45.5	43.3	L	9.5	35.3	0.7		9.5	33.7	38.2		8.0	43.5	54.2	A
9.1	17.5	24.4		9.1	54.7	48.3		8.4	52.2	35.4		9.5	37 27.5	11.1		9.3	57.2	59.1	B
9.1	18.0	28.0		8.5	57.1	32.0	J	9.5	23 4.4	55.5		9.4	38 21.7	15.7	B	9.5	56 7.7	59.6	
9.3	27.6	50.1		9.4	57.5	30.5		7.7	6.8	53.2	J	9.5	31.4	48.6		9.5	18.1	5.0	
9.4	28.7	35.9		8.6	13 9.0	32.7	J	9.5	7.3	53.7		7.6	35.2	25.5	G	9.5	57 18.4	54.1	
9.4	30.7	25.2		8.4	12.2	11.2		9.5	20.5	56.2		6.5	52.0	28.2	G	7.0	26.3	27.2	B
9.0	31.8	56.1	A	9.5	19.0	33.1		8.6	40.8	22.1		9.5	39 10.3	18.0		8.0	36.7	5.3	A
9.4	33.9	18.5		9.1	23.8	12.7		9.2	25 9.0	50.8	R	9.5	17.2	50.3		9.2	43.9	43.2	
9.5	34.3	2.6		9.5	43.2	34.6		9.5	51.4	37.5		8.9	29.6	4.2		9.2	58 14.0	44.2	
9.5	38.2	1.7		8.9	45.8	41.5		9.1	26 0.4	33.5		9.5	30.3	27.5		9.5	45.7	12.7	
8.0	44.9	38.8		9.4	45.8	36.8		9.3	3.5	33.3		9.0	36.1	0.5	B	9.5	59 14.9	52.6	
9.4	57.0	48.0		9.5	58.5	25.8		9.5	3.5	57.7		9.4	58.3	22.6		9.5	28.2	18.5	
8.5	10 4.3	25.5		9.3	14 23.7	33.0	R.	9.4	19.6	4.2		9.0	40 2.7	24.1		8.4	35.8	4.1	
9.5	4.4	4.3		9.0	28.3	49.0	A	9.5	38.8	47.3		9.5	10.0	11.2		9.2	0 30.1	4.3	
8.2	19.5	19.4		9.5	29.0	40.3		9.2	57.2	15.4		9.5	48.6	21.0		8.5	32.6	51.4	A
9.2	26.5	38.1		9.2	37.7	23.2		9.5	27 0.0	50.2		8.5	41 6.8	26.7		9.5	1 2.4	48.5	
9.2	37.1	47.5		8.4	15 3.5	46.8	A	9.5	19.4	19.6		9.5	18.9	55.6		9.5	18.8	13.0	
9.2	42.7	15.2		9.2	5.9	12.0		9.5	21.3	14.7		9.5	20.0	51.2		9.5	21.5	22.1	
8.2	48.3	29.3	L	9.0	19.6	32.0		9.3	45.2	3.2		9.5	31.1	20.1		9.1	23.6	8.6	
9.5	54.2	41.4		9.3	27.1	39.4	A	9.4	47.5	35.6		8.0	48.2	39.2	A	9.4	42.9	1.2	
9.2	54.6	29.8		8.7	28.9	39.9	A	8.3	57.7	24.9		9.3	54.7	51.5		9.5	2 9.1	40.0	
9.2	59.3	8.9		9.5	31.8	30.7		9.5	28 1.3	16.2		9.5	42 58.0	38.2		9.4	3 8.0	12.7	
8.8	11 1.0	11.7		9.5	32.0	46.8		9.5	13.8	19.7		9.4	43 19.8	25.6		9.0	4 10.3	25.9	
9.2	1.6	10.9		8.5	33.0	50.8	A	9.0	16.1	57.6		9.0	21.0	43.9		9.5	11.2	18.6	
9.5	4.6	28.3		9.3	33.2	35.5		8.9	20.6	45.5		9.3	39.7	55.2		9.5	34.3	13.5	
9.5	5.2	41.4		9.4	35.7	34.5		9.5	21.5	49.9		9.3	45.3	18.0		6.0	45.0	35.4	A
9.5	5.3	38.0		9.5	37.0	55.4		9.5	29.5	44.0		9.5	44 2.8	50.9		9.1	53.9	42.0	
9.4	16.3	53.9		8.6	59.9	24.6	B	9.5	42.8	4.8		9.4	3.4	1.6	B	8.9	5 17.4	44.5	

801—860				861—920				921—980				981—1040				1041—1100			
	3ᵘ				3ᵘ—4ᵘ				4ᵘ				4ᵘ—5ᵘ				5ᵘ—6ᵘ		
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	6 21.0	28.9		9.4	46 47.1	19.9		9.4	15 51.4	19.7		9.0	40 49.4	36.0		7.3	25 12.8	22.8	A
9.4	35.6	0.0	B	8.9	51.5	34.6		8.7	16 37.8	2.5		9.0	42 5.9	40.0		8.3	26 38.2	51.7	A
9.1	7 44.8	6.2		9.4	47 28.3	16.1		9.0	44.5	5.1		9.3	43 21.5	28.7		9.5	45.0	41.0	
8.8	8 0.1	22.9		9.2	34.8	48.8		9.4	17 7.4	39.2		9.4	25.0	9.4		6.9	52.6	16.3	A
9.5	9 14.4	42.5		9.0	38.6	9.1	B	8.8	18 11.6	44.2		8.9	30.9	30.9		9.5	28 1.8	49.8	
9.5	10 30.9	13.4		9.5	48.3	41.4		9.0	35.0	8.1		8.9	56.6	4.3	B	9.3	54.5	51.3	
9.5	46.6	1.0	B	9.0	48 42.6	0.2		9.5	19 12.7	28.9		9.1	44 49.7	27.2		9.5	29 15.5	40.0	
9.0	13 4.5	9.6		8.8	45.3	29.0	A	9.4	40.6	40.5		9.0	45 23.5	24.3		9.5	30 31.9	47.9	
9.1	14 7.1	20.5		9.3	50 45.2	54.3		8.7	52.8	39.0	A	8.5	46 57.3	22.0	A	9.3	37.3	6.2	B
9.5	8.8	37.0		9.5	50.0	12.7		9.5	56.5	10.1		9.5	47 17.1	29.8		6.5	45.8	30.6	A
9.5	40.9	2.2		9.5	51 0.2	21.1		9.5	57.2	13.2		9.3	48 38.9	19.8		9.4	31 15.3	56.8	B
8.4	15 17.6	54.2	A	8.7	33.1	58.3	B	8.4	20 4.5	53.0	A	9.5	55.3	15.0		9.2	32 12.7	10.0	B
9.1	16 10.9	22.9		8.9	38.0	7.7	A	9.5	17.4	1.7		7.8	49 4.6	2.7	B	9.0	36.0	45.7	A
9.5	59.0	0.6		9.3	52 22.2	38.5		9.0	24.6	39.6	A	8.0	34.9	53.9	A	9.5	38.8	4.6	
9.5	19 20.2	41.9		8.0	53 0.2	20.0	B	9.5	21 7.6	50.0		9.5	45.4	36.6		9.3	33 30.7	44.7	A
9.3	20 27.4	35.6		9.4	14.4	17.9		9.5	45.0	31.1		9.5	50 54.3	17.6		9.0	39.5	39.2	A
9.4	21 8.5	4.7		9.0	58.9	42.7		8.5	55.4	24.2		9.5	51 17.2	27.5		9.5	50.8	18.7	
9.4	12.8	33.2		9.2	54 52.2	9.2		9.5	22 37.9	40.5		9.0	33.9	27.8		6.1	34 18.8	2.5	G
9.5	22 17.1	53.0		7.6	55 29.0	20.5	L	8.7	23 26.1	30.3		9.5	53 12.4	41.0		6.6	33.0	50.6	A
8.9	36.5	27.2		9.1	43.1	56.9		9.4	32.7	38.6		9.5	17.5	56.9		9.0	54.5	27.0	
9.4	37.6	45.4		8.5	56 40.8	28.6	B	8.5	48.0	58.2	A	8.0	54 7.4	24.3	A	8.6	58.9	22.1	
9.5	24 10.3	19.0		9.4	57 16.3	27.4		9.5	56.8	48.9		8.8	27.1	41.6		8.7	36 49.0	52.1	A
9.3	25 34.0	23.2	B	9.2	23.5	45.7	B	9.1	24 9.3	37.1		9.5	55 0.0	6.5		9.5	37 9.2	31.5	
6.6	26 26.0	14.0	A	8.1	38.0	41.9	B	9.0	40.0	8.2		9.3	27.0	48.6		9.5	50.0	31.0	
9.0	31.6	37.8	A	8.4	49.4	3.2		9.0	25 35.7	27.5	A	8.5	56 34.4	31.3		6.6	38 12.5	51.6	A
6.5	57.6	28.1	A	9.4	58 39.3	52.3		9.2	36.5	7.0	B	9.5	54.0	55.0	B	9.1	42.4	19.2	
9.3	27 10.5	23.5		9.5	58.2	46.3		9.4	43.1	22.0		8.0	57 57.8	31.2	A	9.3	49.9	32.7	
9.5	49.2	12.0		8.9	59 10.1	45.4	B	9.1	46.7	43.1	A	8.1	58.7	40.1	A	9.5	50.5	46.7	
9.0	28 5.1	59.5		9.5	0 4.0	10.6		8.0	26 0.9	48.1	A	9.2	58 2.1	16.5		9.0	52.5	20.0	
9.0	29 58.4	41.4	A	9.4	43.3	32.0		8.7	2.2	30.2	A	8.0	4.4	52.7	L	9.5	39 5.8	0.0	
9.0	59.5	27.7		9.1	1 13.9	39.2		9.5	27.3	37.8	B	9.3	53.0	49.9		9.3	18.4	1.5	
9.5	30 25.1	52.2		9.0	27.1	48.3		9.5	40.5	54.4		9.3	0 3.6	39.3	A	9.5	40 6.8	22.6	
9.5	27.8	27.6		9.0	34.7	9.6		9.5	44.8	40.0		9.0	1 36.2	32.2		8.5	19.7	1.5	A
9.5	49.7	33.4		9.1	42.0	23.4		8.0	27 1.1	20.5	A	7.8	47.7	19.7	A	9.5	48.5	39.9	
8.5	31 5.6	0.2		9.5	3 56.9	19.9		9.0	8.4	19.7	A	9.5	2 44.0	45.3		9.5	50.4	35.8	
9.5	34 35.0	35.6		9.5	4 0.9	39.8		9.5	28 34.9	14.0		9.5	4 21.5	35.9		9.5	41 40.0	18.7	
9.4	38.2	32.3		9.5	46.7	12.0		8.7	40.8	58.4		9.2	27.7	20.1	B	7.8	41.2	59.5	A
8.9	35 11.3	49.8		8.7	5 3.1	53.2	A	9.0	42.5	53.9		9.5	28.3	8.8		8.6	42 10.5	10.8	A
8.9	17.6	6.2		7.3	31.7	48.8	A	9.2	29 0.1	28.8		9.5	28.8	10.1		9.4	38.5	0.7	B
9.3	43.1	32.2		9.5	6 50.0	4.6		9.5	55.1	49.5		9.4	7 13.6	46.9		8.4	44 42.5	56.0	A
9.5	43.7	0.7		9.2	7 15.2	43.4		9.3	30 16.5	36.9		9.5	8 12.5	45.9		9.5	46 23.9	38.4	
9.2	36 7.0	24.7		9.4	52.1	15.0		9.5	26.1	19.3		8.9	10 14.7	24.4		9.5	47 59.0	18.7	
9.4	25.7	40.9	B	9.5	8 1.9	48.8		8.8	48.9	39.8	A	9.4	40.3	28.0		7.5	48 15.0	53.2	G
9.5	56.3	49.3		8.0	9 18.4	21.4	A	8.0	53.5	54.9	A	9.5	44.0	15.4		9.5	49 19.5	50.1	
8.5	37 9.6	34.0	A	6.3	10 5.5	9.2	A	9.4	31 25.6	25.4	B	9.5	13 32.0	32.0		9.5	50 14.3	12.8	
7.0	48.6	39.5	A	9.4	11.8	55.2		9.5	59.5	19.8		9.5	47.4	58.7		6.5	42.1	59.5	A
7.5	55.1	40.1	A	8.3	16.5	58.2	A	9.3	32 2.4	54.4	A	8.8	14 18.0	30.3		9.5	51 23.2	34.5	
9.4	38 52.1	36.6		9.4	16.9	4.0		9.3	59.0	1.5		8.4	40.8	14.8		9.5	53 18.6	3.4	
9.5	39 8.3	43.8		9.1	27.7	11.1	A	8.4	33 48.5	53.9	A	7.5	15 42.3	9.3	L	9.4	55 18.3	6.4	
9.5	25.0	43.7		9.5	38.2	34.9		9.4	34 15.3	29.1		9.2	18 21.9	34.1	A	8.5	56 19.3	10.1	A
9.5	44.3	43.1		9.5	11 55.0	19.0		9.0	39.6	19.6	A	9.3	19 18.8	11.9	A	8.0	50.9	12.5	B
9.4	40 36.9	43.3		9.5	56.1	21.9		9.0	35 39.9	59.8	A	9.5	51.2	33.7		8.9	57 0.3	23.1	A
9.0	51.6	43.4	A	9.5	12 22.3	9.4		5.8	57.7	29.9	A	9.5	57.5	45.9		8.0	44.0	17.0	A
9.5	42 58.4	24.7		9.5	31.8	31.2		9.5	37 37.0	1.3		8.8	21 48.5	46.2	A	9.5	58 21.9	10.3	
8.0	43 17.1	59.3	A	9.0	13 5.5	29.8		8.5	54.4	18.7	A	8.0	22 5.1	9.4	A	9.5	59 22.0	35.3	
8.2	56.4	3.5	A	8.0	34.9	2.4	A	7.3	38 46.4	16.2	A	9.4	5.3	10.9	B	8.8	43.4	11.7	
7.0	44 12.1	29.4	A	9.5	14 0.8	40.0		8.7	39 12.5	55.4		9.5	37.5	23.9		9.5	0 59.4	3.0	
9.0	26.1	27.7	A	9.5	54.5	16.8		9.3	35.7	20.8		9.4	48.9	57.8		9.5	2 4.1	33.3	
9.4	46 9.8	40.7		9.5	15 1.6	53.5		9.5	56.2	29.4		9.0	24 0.4	34.4		9.5	34.2	21.5	
9.2	12.6	45.9		9.5	47.7	32.3		7.6	40 3.5	10.0	G	8.3	0.5	17.7	A	7.3	3 54.0	57.9	A

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	6ᵘ		+56°		6ᵘ—7ᵘ		+56°		7ᵘ—8ᵘ		+56°		8ᵘ		+56°		8ᵘ—9ᵘ		+56°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
7.0	4	6.0	44.7	A	9.5	41	42.1	37.4		9.5	21	1.4	9.0		9.5	3	45.4	24.5		9.2	40	40.8	19.6	
9.5	5	8.9	5.4		9.5		47.2	58.0		9.5	22	7.8	34.3		9.4	5	11.4	58.6		9.5		52.5	40.2	
9.5		38.3	58.3	B	9.0	42	9.8	57.6		8.7	23	25.8	43.2	B	9.5		15.0	54.5		9.5	42	19.5	52.1	
8.8		42.6	39.4	G	8.3		54.5	7.1	A	9.5		58.3	28.3		9.5	6	3.4	24.5		9.4	43	29.5	19.6	A
9.5	6	24.7	39.2		8.5	43	31.9	48.1		9.5		58.6	33.7		9.2		41.2	42.3	R	9.5	44	14.5	44.9	
6.8		52.9	34.2	A	9.5	44	3.4	58.0		8.0	24	19.5	42.3	A	9.5	7	9.8	54.0	B	9.5		48.8	41.4	
9.3		53.4	5.9		9.2	45	23.3	53.0		6.0		58.2	4.7	A	7.0		29.4	42.3	A	9.5	45	21.3	8.4	
8.0	7	16.3	17.2	A	9.0		40.5	8.5		9.5	26	45.8	20.5		8.9		47.4	54.0	A	9.5		25.2	3.3	
8.9		43.5	57.4	A	9.3	46	0.8	50.7		9.5	27	54.4	32.6		9.1	11	26.1	53.4	A	9.1		59.8	56.1	A
9.5		51.8	11.7		8.7		49.3	59.5	A	8.6	29	4.5	48.6		8.9		26.2	56.3	A	9.3	47	16.5	30.8	
9.3	8	27.6	17.9	B	8.0	48	2.0	18.0	A	9.2		31.3	16.5		9.5	12	12.4	40.6		7.8		33.5	24.9	B
8.5	9	22.8	13.8	A	9.1		15.0	24.2		9.2	31	27.3	32.9	A	9.5		18.3	30.8		9.5	48	32.2	37.9	
9.2	10	7.4	25.3		8.5	51	59.8	38.3	S	9.5		53.8	6.2		9.4	13	24.3	6.2		9.4	49	19.5	47.3	
9.0		13.9	29.3		8.6	53	59.5	27.6	A	9.3		55.2	18.9		9.5		26.5	57.8		9.4	50	16.5	45.6	
7.8		15.3	2.9	A	9.4	54	9.4	38.0		8.3	33	31.7	29.2	A	8.9	14	5.3	15.5		8.1		18.1	25.2	B
9.3		40.6	49.0		8.5		44.3	51.7		8.5		33.2	58.0	A	9.2		27.3	23.3	R	9.5	51	9.5	40.8	
9.2		46.7	37.8		9.5	55	4.4	11.9		9.3	35	44.5	32.4		9.2	15	11.8	58.6	A	9.5	53	13.3	14.7	B
9.6	11	54.4	4.4		9.3		50.1	11.9		8.2		49.0	25.6	A	9.4	16	29.0	26.9	B	9.4	54	9.5	37.5	
9.4	12	14.6	59.5	B	9.1	56	6.3	31.0		8.6		53.7	19.1	A	9.5		46.0	45.0		9.5		50.5	56.0	
8.8		34.0	28.6		7.8		8.0	5.1	F	8.5	37	57.8	20.0		9.5		57.0	38.0		9.4		53.0	43.3	
9.5		34.9	21.0		9.3		31.9	24.5		8.6	39	17.6	44.7	A	9.4	17	2.3	17.5		7.4	55	3.9	6.3	A
8.5		59.0	47.7	A	9.5	57	39.2	36.4		9.3		43.5	50.6		9.5		42.7	56.8		9.5		29.8	6.3	
8.5	13	4.0	55.9	A	8.5	58	9.8	40.3	A	9.5		52.5	55.0		9.5	18	35.1	23.4		9.5		50.0	56.5	
8.3		40.5	52.6	A	9.5		24.7	33.8		9.0		56.5	13.6	B	9.4	19	52.4	20.1		8.6	56	43.5	41.1	A
6.2	14	11.8	20.1	A	8.8		36.9	51.2	A	9.4	40	20.6	56.5		7.8	20	26.8	15.7	R	9.5	58	21.2	18.6	
8.9	15	3.3	49.1	A	9.5	59	4.0	10.9		9.3	41	8.2	8.6		9.3	21	4.5	46.0	A	9.4		32.0	42.9	
9.5	17	55.5	30.3		9.5		23.9	49.1		9.0		34.8	19.4	A	9.5		46.0	58.1		9.5	59	35.0	58.8	
8.5		56.4	13.2		8.3		33.4	31.0	A	9.5		38.5	0.7		9.4	22	5.5	31.9	B	9.1	0	5.9	50.9	
9.1	19	58.3	38.1		9.2		51.5	13.5		8.9	42	2.3	19.4	A	9.5		15.4	50.6		9.4		24.9	33.6	B
9.0	21	54.3	44.7	B	8.7		55.9	19.2	B	9.5		54.0	54.0		9.5	24	19.2	56.1		9.5	1	38.7	5.4	
8.8	23	2.0	1.6		7.7	0	53.5	2.1	A	9.5	44	32.4	43.8		9.3		53.3	8.8		8.6		46.3	53.5	A
9.4		23.7	20.3	B	9.0	1	17.8	49.1		9.2		33.0	29.0		8.0	25	50.2	19.9	A	9.5	2	55.5	26.5	
9.2		39.8	57.2		9.2		29.5	42.0		7.0		40.0	52.7	G	8.6		53.0	58.9	A	9.2	3	45.5	48.9	A
6.8		48.5	29.4	A	8.8	2	14.9	23.6		8.6	45	2.4	37.2		7.5	26	11.7	28.6	A	9.0		47.5	30.0	
9.2	24	27.0	15.4		9.3		47.3	32.9		8.5		10.5	23.0		9.5	27	1.1	30.5		7.5	4	13.8	12.7	A
6.2	25	19.0	58.7	A	9.5	4	5.9	32.5	B	9.3		40.4	57.2	B	9.5		9.0	30.0		9.0		27.5	2.6	A
8.7	26	3.9	0.6		9.5		58.2	21.5		8.5	46	23.9	23.5	A	9.4		25.8	8.7		8.3	5	15.5	40.0	
9.1		9.5	54.0		9.0	6	51.6	17.4		9.4	47	40.5	53.5	A	9.1	28	37.8	40.6	R	8.7		59.9	35.8	B
8.0	28	27.0	59.8	A	8.8	7	2.1	49.6		9.2	49	13.8	58.4	A	9.5		45.3	5.4		9.5	6	35.4	55.4	
7.5		48.5	12.4	A	8.8		31.2	19.4	A	9.1		42.5	42.1		9.3		49.5	59.1	R	9.5		55.7	37.9	
9.5	30	15.9	41.2		8.6		52.5	31.5	A	9.3		49.1	35.4		9.1	29	37.3	17.6	L	9.5	9	44.8	38.9	
9.4		20.2	5.4		9.0	8	1.5	1.1		8.9		56.2	2.8	B	8.1		37.5	11.6	A	9.5	13	27.0	7.4	
8.0		36.0	49.2	A	8.6	9	36.4	1.9		9.3	50	5.0	36.1	B	8.8	31	11.5	37.5	A	8.5	16	33.0	49.5	A
9.0		53.2	8.0		8.7		52.9	33.5		8.5		9.0	13.5	A	8.5		28.5	54.1	A	9.3	17	8.5	39.7	
9.1		54.9	8.9	B	8.7	10	17.7	4.0		9.1	52	16.7	29.2		9.5	32	37.5	49.2		9.4	18	21.6	43.7	
9.5	31	23.5	25.9		9.5	11	38.0	16.9		9.0	55	30.0	58.4		9.5	33	1.4	1.4		6.5		54.0	51.8	A
8.8		38.8	17.4		7.7	13	15.9	50.7	A	9.0	56	22.9	51.0		9.5		34.5	23.3		9.5	19	1.2	16.7	
9.5		58.5	41.7		7.5		23.0	49.1	A	9.5	57	54.0	35.2		9.0		43.8	3.3	A	6.6		25.2	22.2	G
8.3	32	12.0	0.2	A	9.5	14	10.8	35.8		7.9	58	41.1	13.4	B	9.5	34	35.2	38.9		8.8	20	7.5	34.0	A
9.5	33	22.5	7.6		9.5		37.9	1.6		9.1		52.5	7.2		9.5	36	6.8	16.1		9.1	22	30.6	53.2	A
9.5		26.8	35.3		9.5	15	9.5	55.0		9.5	59	12.0	43.2		9.5		12.3	2.4		9.1	24	40.3	49.0	B
9.3	35	23.0	35.8		9.0		55.8	3.1	A	8.8		17.4	36.8		9.4		37.8	37.8		9.5		44.4	34.3	
9.5		37.6	17.8		9.1	16	6.8	4.1	A	9.0		51.3	29.8	R	9.3		46.4	27.9	R	9.2	25	47.9	11.7	
9.0	36	36.2	6.3	B	8.7		46.3	38.0	A	8.9	1	0.4	27.2	A	9.5	37	9.3	10.2	R	9.4		51.6	48.9	
9.2	37	46.8	41.9		9.5	17	2.5	29.5		8.0		30.8	3.7	A	9.5		47.5	41.2		9.5	27	48.6	39.7	
9.3		53.5	19.8		9.4	18	8.6	23.9		6.8		45.9	57.9	A	8.2		57.5	52.0	A	9.3	28	16.2	30.8	
9.4	38	12.9	40.3		9.5		20.5	41.8	B	9.1		58.3	18.5	R	8.5	39	1.5	44.3	A	6.5	31	3.5	31.1	A
8.8		30.8	28.2		8.5		54.4	33.8	A	5.7	2	14.9	52.9	A	9.3		43.2	48.7	A	9.0	32	13.0	50.5	A
9.0		59.0	10.4	A	9.5	19	58.7	12.4		9.5		59.8	45.6		9.4	40	2.6	38.4		8.5		27.5	19.5	A
9.5	40	0.3	0.4	B	9.5	21	1.0	59.0		9.4	3	40.2	4.7		9.5		4.5	47.4		7.5	33	31.0	37.2	A

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	9ʰ—10ʰ	+56°			10ʰ—11ʰ	+56°			11ʰ—12ʰ	+56°			12ʰ—13ʰ	+56°			13ʰ	+56°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	34 24.6	1.6		9.4	23 57.0	35.9	B	7.8	20 1.5	28.3	A	9.1	8 39.7	41.2	A	9.5	1 29.5	11.0	
9.0	35 52.9	26.4	A	9.4	57.2	30.7		8.9	23 47.9	9.8	A	8.2	59.5	44.2	A	9.4	2 16.6	25.2	
9.5	36 45.0	19.8		9.0	24 50.1	42.1	A	7.7	24 19.4	54.6	A	9.0	9 11.3	23.0		9.5	41.5	22.5	
9.5	37 1.3	27.2		7.8	25 14.8	54.6	B	9.5	46.7	0.5		9.3	10 49.0	54.1		9.0	4 25.4	44.1	B
9.3	3.9	28.7	B	9.0	26 7.2	47.3	A	8.4	49.8	12.8	A	9.1	12 5.5	27.5	B	8.7	5 40.7	41.9	A
9.5	20.6	42.0		9.5	27 14.1	54.0		8.0	25 33.5	23.6	A	9.3	11.9	20.7		9.1	9 19.5	4.2	
9.2	38 31.1	28.8		9.3	28 57.2	33.7	A	9.3	35.9	25.0	B	9.0	13 43.5	0.5		9.0	10 24.0	34.7	
9.3	58.6	9.5	A	8.7	29 56.5	16.2	A	9.5	27 5.4	18.9	B	9.4	14 41.0	43.8	A	9.5	11 2.4	55.0	
9.3	39 11.5	18.4		9.5	30 28.3	39.5		7.2	28 39.3	57.5	A	8.9	50.3	13.2		9.5	13 5.4	18.5	
9.3	40.5	17.4		9.5	31 12.0	53.4		9.4	45.0	14.2	A	8.2	15 39.8	38.8	A	9.0	50.8	43.2	A
9.5	41 53.6	25.0		9.0	25.0	24.2		9.3	51.9	1.5		9.2	18 19.8	42.2	B	8.7	14 10.5	35.4	A
8.2	43 36.7	26.7	A	7.5	33 48.2	39.0	A	9.4	29 5.0	36.9		8.4	25.4	18.6		9.4	20.8	25.2	B
8.8	44 32.6	46.6	A	9.4	37 36.0	31.7	A	9.2	8.4	15.2	A	9.4	36.0	10.8		9.4	23.2	31.3	
9.5	48.2	44.1		8.8	40 28.2	2.6	B	9.5	31 21.8	37.9		8.9	19 4.3	17.2		9.1	33.5	32.7	A
9.1	45 32.1	2.1		9.2	45.1	49.2		9.3	32 7.4	50.6		8.9	7.5	43.2		8.9	16 5.0	39.7	B
9.0	51.5	5.6	A	9.2	57.2	48.6	B	8.0	26.9	6.0	A	9.5	20 10.6	6.9		9.5	18 47.4	28.3	
9.3	48 44.8	0.2	B	9.2	41 44.5	58.3	B	9.5	34 24.8	19.2		9.5	37.9	56.5		9.5	20 58.2	30.5	
9.2	49 22.6	47.9	B	8.9	42 7.0	20.7		9.1	37.1	18.3	B	6.0	39.7	30.3	A	8.7	21 51.3	45.5	A
9.2	22.7	0.3	B	8.9	12.7	50.5	A	8.6	35 3.4	7.4	A	9.4	53.5	1.5	B	9.5	22 48.0	13.2	
9.5	50 13.5	14.4		8.8	24.0	54.0	A	8.0	19.4	50.1	A	8.5	22 41.5	2.0	A	9.2	23 9.7	27.6	
8.2	51 49.1	19.3	G	9.0	24.0	57.5	B	9.2	38 35.9	54.2		9.2	24 50.9	48.6	A	7.5	25.3	58.8	A
9.3	52 21.6	19.8		7.8	43 7.4	7.3	B	8.1	37.5	8.8	B	9.1	59.3	51.6	A	9.1	25 57.8	51.0	B
9.0	30.1	46.6		8.9	35.6	55.9	A	8.9	47.9	51.7	B	9.4	25 32.2	15.9	A	9.4	26 1.3	44.6	
9.1	31.8	16.2	B	9.5	47 13.0	26.0		5.7	39 8.8	26.8	G	9.4	26 32.0	21.2	A	8.9	27 13.5	29.2	A
9.4	54 50.9	32.0		9.2	48 2.7	37.3	A	9.4	40 16.5	59.0		8.7	33.7	6.0	A	9.5	34.3	47.5	
9.0	52.6	51.5		9.4	30.6	35.5	A	9.5	17.4	54.1		9.5	27 33.2	9.0		9.4	28 13.9	22.0	
9.2	55 8.0	9.0	B	9.4	42.7	5.9		8.1	51.9	20.2	A	8.5	57.6	4.6	A	6.0	33.0	5.5	A
8.0	9.0	10.1	S	9.2	53.5	8.9	B	9.2	42 27.8	4.5		9.5	30 44.0	32.8		9.5	30 31.2	17.7	
9.3	32.6	50.5		8.3	57.5	36.5	A	9.2	43 44.6	24.5		9.5	52.2	39.3	B	9.5	32 30.8	32.8	B
7.5	56 40.9	30.1	A	7.7	49 10.8	12.2	A	9.0	44 14.5	5.3		8.6	53.3	45.2	A	9.5	45.1	3.9	
8.0	57 3.6	21.4	A	9.0	50 20.0	28.1	B	9.3	45 6.5	23.5		9.2	31 13.4	49.7	A	9.0	33 28.5	24.0	A
9.4	28.1	54.8	B	9.4	57.5	40.1	B	9.4	47 27.0	12.6		7.5	32 33.5	47.8	A	9.4	34 44.3	56.3	
9.5	59 37.6	4.1		9.5	51 42.0	32.5		9.3	31.4	31.4		9.5	33 5.4	10.4		9.1	35 12.1	26.5	B
8.0	56.5	0.1	A	9.3	55 46.1	28.2	A	8.8	42.0	50.1		9.0	10.3	34.9	A	9.0	46.8	48.4	A
8.5	0 7.6	15.4		9.3	56 1.2	52.5	A	9.4	48 23.5	39.9		8.2	44.2	38.3	A	9.1	36 18.7	45.4	A
9.4	41.2	19.4		9.1	57 0.8	13.3	A	9.1	50 1.6	20.0		9.5	58.7	8.0		9.5	28.0	54.8	
8.7	1 22.9	40.8		9.5	58 0.9	11.3		9.2	52 27.7	32.3	A	9.5	35 3.2	17.8		7.0	37 8.5	26.7	A
9.4	3 6.1	25.3		7.5	2.6	50.3	A	8.8	54 21.8	37.9	A	8.2	6.3	32.0	A	9.5	44.8	41.4	
8.9	18.1	34.3		9.0	12.8	29.8		8.9	55 0.4	44.2	A	9.5	30.1	29.1		9.4	38 0.5	22.0	
9.4	31.8	32.8		9.2	59 27.2	41.0	B	9.4	56 19.5	19.7	B	9.4	36 37.2	11.9		9.5	6.0	17.7	
8.4	35.2	37.3	B	9.3	0 1.9	24.4		9.4	46.0	14.5		9.4	46.5	55.6		9.2	13.3	12.7	
9.1	4 10.3	30.9		9.3	23.5	33.1		9.5	57 2.1	16.2		9.0	37 30.7	18.3		8.0	43.8	21.5	A
7.8	38.5	54.5	A	8.4	42.2	29.7	A	9.5	42.2	24.5		9.5	38 30.0	39.8		7.0	39 52.8	37.7	A
9.5	57.0	9.6		9.0	1 41.8	28.7	A	8.8	55.0	47.7	A	9.3	42 39.2	2.1		9.5	40 16.1	22.2	B
9.4	5 4.3	59.8		9.5	2 43.7	1.0		9.4	56.3	12.7		9.5	48.5	21.3		9.5	41 5.7	40.0	
9.4	6 9.2	41.5		9.5	3 31.9	14.3		8.9	58 48.2	2.0	B	9.5	43 55.4	30.3		9.3	10.6	10.8	
7.3	7 55.1	37.4	A	9.5	4 2.7	56.5		9.5	57.0	25.7		2.0	47 40.0	43.8	S	9.4	16.7	29.3	
9.5	8 30.4	49.7		7.5	5 9.3	11.2	F	8.0	0 51.3	15.7	A	9.0	40.4	16.4		9.4	22.8	10.4	
8.8	10 44.6	34.6		9.3	58.5	59.3		8.3	54.3	15.8	A	8.0	48 31.9	54.0	A	9.1	24.6	8.4	B
8.5	11 34.4	15.6		8.7	10 7.8	4.0	A	9.3	2 36.3	23.4		8.9	51.9	22.4	B	8.8	45 48.2	23.6	A
9.5	12 31.6	43.1		7.1	10.4	59.0	A	9.1	53.2	17.4	B	7.9	49 17.8	59.5	A	9.5	46 52.8	31.1	
9.5	55.1	54.4		8.2	48.6	41.6	A	8.4	3 43.0	54.5		9.5	50 15.3	21.7		9.5	47 16.2	18.7	
9.5	17 8.0	33.3		9.3	11 12.8	54.3	B	9.4	4 30.5	49.6		9.3	53 19.2	5.0		9.5	49 34.3	47.0	
9.5	18 8.5	59.3		9.0	20.3	59.4	A	9.1	5 1.4	44.7		9.1	54 25.1	56.1	A	9.5	56.5	1.5	
9.1	19 37.4	7.0		9.4	14 27.5	32.3	A	7.3	7.8	31.0	F	9.5	56 0.0	8.0		9.5	50 17.7	39.0	
9.4	58.0	37.9		9.1	17 34.4	14.7	A	9.3	35.3	1.9		9.2	17.0	51.2	B	9.5	52 30.8	49.4	
9.5	20 58.0	25.8	B	9.3	44.0	4.5		9.3	43.5	36.5		9.4	50.0	7.6		9.5	41.3	39.5	
8.5	21 8.0	44.0	A	6.2	46.1	38.9	A	8.5	7 9.4	23.5	R	9.4	58 3.3	29.8		9.5	53 25.0	26.9	
4.7	21.9	42.7	A	7.9	19 4.4	1.5	A	8.6	8 5.5	19.1	B	9.5	48.4	24.7		8.6	54 11.2	66.7	
9.0	46.3	6.1	B	9.3	21.0	36.3		9.3	10.0	24.9		9.4	0 4.2	54.6		8.5	31.5	31.2	R

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	13u—14u		+56°		14u—15u		+56°		15u—16u		+56°		16u—17u		+56°		17u		+56°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.5	54	39.3	51.2	9.3	42	41.6	30.5	9.0	35	39.0	11.5	9.5	14	2.0	55.4	9.5	0	59.7	14.9
8.3	55	56.3	7.9 A	9.3	43	51.4	47.2	9.1	36	0.7	40.2	9.0		6.0	21.2 A	8.8	1	21.0	10.4 A
9.1	56	26.2	28.9 R	9.2		56.2	30.2	8.9		49.4	39.6 B	9.4		33.3	35.5 B	7.8	2	23.9	43.9 A
9.0	57	10.5	35.0 A	9.5	45	39.1	7.9	9.4	37	0.6	14.4	8.8	15	11.7	28.9 A	7.0		59.2	19.5 A
9.3		18.0	40.4	9.1		51.6	16.2	9.5		32.0	8.5	9.5	16	0.6	16.6	9.5	3	14.4	36.6
9.5	0	7.7	46.4	9.5		59.7	13.2	9.5	38	10.4	39.8	9.0	17	26.6	4.8	9.5		41.0	59.4
9.5	1	2.6	25.1	7.2	48	20.5	20.4 B	9.5		31.8	49.1	8.5		31.2	23.1	9.5	4	41.3	51.3
8.0		17.8	6.9 A	9.3		45.1	27.2	8.5		52.9	0.1 A	9.5	18	27.7	30.7	9.0		50.4	25.2
9.0		55.9	56.6 A	9.3	50	19.9	45.7	9.5	41	30.1	3.1	9.4	20	20.8	16.1	8.0	5	9.2	20.9 A
9.5		59.4	25.6	9.5	51	27.9	58.5	9.5	42	53.9	22.0	9.5	21	54.5	28.8	9.5		43.6	53.1
9.5	2	23.8	33.2	9.5		42.3	32.2	9.0	44	25.0	32.9	9.3	22	56.0	14.6	9.4	6	3.9	35.2
8.7	4	37.8	46.8 A	9.5	52	25.8	39.3	9.5	45	11.3	33.7	7.9	26	3.0	54.8 A	9.5	7	26.7	19.6
9.1	5	15.0	57.6 A	9.5	53	22.4	29.5	7.1		56.0	40.8 B	9.5		6.5	13.4	9.5	8	15.6	53.0
9.0		48.4	54.2 A	8.9	55	17.2	10.7	9.1	46	47.8	53.4	9.0		9.6	56.0 B	7.5		32.7	50.1 P
9.5	7	39.3	40.4	9.5		27.5	35.2	9.4	47	11.9	34.8	9.5	27	42.5	43.2	9.5		51.9	42.8
9.5		42.8	46.9	9.3		36.6	10.0	9.5	48	27.9	3.6	9.5		44.0	29.4	9.4	9	12.9	9.2
8.9	8	2.5	14.7 R	7.0	56	18.3	11.5 B	9.5		51.4	32.7	9.2	28	20.6	17.1 A	9.5		42.8	59.9
8.0		13.3	0.9 S	9.5	58	54.9	3.6	6.4		55.5	15.5 A	9.5	29	5.8	15.6	9.5	11	7.8	28.0
8.5		45.5	1.9 R	9.2		57.6	58.0 A	9.5	49	15.7	19.9	9.0	30	24.8	7.8	7.7		24.2	18.1 J
7.8		59.3	59.1 A	6.8	59	24.0	36.6 A	9.3	50	1.8	20.8	9.4	31	20.7	9.7	9.5		26.1	36.9
9.5	9	18.4	23.9	9.0	1	21.0	28.3 A	9.5		12.5	47.1	9.3		40.5	44.6	9.4		42.8	34.1
9.0		54.3	46.4 A	7.5		24.4	14.9 A	9.2		30.5	58.4	9.0		47.0	47.6	9.4		54.4	38.9
9.5	11	5.3	55.7	neb	2	30.0	19.2	9.5		33.3	21.5	9.2	32	10.7	19.6	8.0	13	6.7	14.1 P
8.7	12	19.7	24.7	9.3		56.4	27.3	8.5	52	12.5	14.1 A	9.5		41.3	51.0	9.5		25.7	50.1
7.3	13	0.9	5.6 A	9.3	4	45.4	23.0	9.5	54	59.4	32.3	9.0	34	33.5	2.3 A	9.5		39.5	3.0
9.5		38.3	49.4	9.3	7	12.5	29.5	9.5	55	33.0	0.9	8.8	35	4.3	25.4	9.5	14	4.4	12.3
9.5	15	28.5	50.8	7.8	8	7.9	34.8 A	9.4	56	25.7	33.7	5.4		6.7	18.0 G	9.4		22.1	21.5
9.1	17	28.9	43.4 R	9.2		17.8	28.0	9.2		39.0	38.6	9.5		8.3	18.8	9.5		48.6	47.7
8.0		54.1	31.5 B	9.1		34.0	10.0	9.5		57.0	1.3	9.4	36	9.0	58.7	9.5	15	49.3	16.6
9.4		56.4	29.5	7.3	9	8.4	35.9 A	8.0	58	1.3	50.5 A	9.3		13.3	47.0 A	9.4		55.8	14.9
8.5	19	9.5	14.3 A	9.3		50.3	49.6	9.5		23.2	29.4	7.8	37	45.0	27.5 J	8.0	16	48.9	19.7 A
9.0		39.4	48.3 A	8.5		52.2	40.2 A	8.9		49.8	59.4 A	9.5	39	38.1	18.1	9.3		52.3	9.9 B
9.5		59.8	19.4	8.7	12	9.7	33.2 A	9.5		51.0	41.2	9.5		49.0	26.0	9.4	17	11.7	45.6
9.5	20	7.9	31.9	9.5	13	15.9	33.4	9.5	59	7.0	9.2	9.5		59.0	29.9	7.5		23.1	4.8 A
9.5		59.6	37.9	9.5	15	14.8	55.5	9.5		41.4	45.6	8.8	40	44.3	0.9	9.0	19	2.9	45.7
9.5	21	45.8	44.8	9.5	16	31.4	36.8	9.2		53.6	52.5 A	9.5	41	49.0	9.2	9.5		17.2	5.5
8.0	22	17.1	41.1 L	9.3		54.3	58.0	9.4	1	6.4	26.7	8.0	42	41.9	2.3	8.3		28.4	45.4 A
9.5		30.0	46.9	7.3	18	20.9	12.9 A	8.9		9.5	14.9 B	8.9	43	15.9	21.5	9.2		40.7	52.8
9.3		39.2	36.2	9.4		32.1	10.4	9.5		9.5	2.2	9.0		43.8	38.2	9.4	20	30.2	19.8
9.0	23	33.9	1.1	9.3	19	13.4	54.0	9.5		15.0	42.1	9.4		51.7	2.9 B	9.5		55.8	32.2
9.4	24	10.7	27.3	9.5		49.0	15.1	8.2	3	20.0	28.0 A	9.5	44	14.8	9.6	9.5	21	4.5	0.0
8.4	25	29.8	44.9 A	9.5	20	12.3	22.8	9.0	4	17.1	21.0	9.1		47.0	53.9	8.9	22	26.9	35.6
9.3	26	20.5	21.1	9.5	21	0.4	52.1	9.0		26.2	40.2	9.5	45	36.5	28.0	9.5	23	58.1	46.4
8.9		24.5	53.1 A	7.8		18.8	7.3 B	8.5		31.3	38.0 A	9.5		43.9	7.6	8.5	24	3.8	28.4
9.0		49.3	48.7	9.5		48.0	52.0	8.5	5	56.5	18.0 A	9.5	47	33.2	41.3 B	9.1		41.6	29.2
5.9	27	58.6	2.3 B	9.3	22	14.0	58.0 B	9.5	6	4.5	53.4	9.4		53.0	26.1	8.8	25	14.8	16.3
8.4	28	4.2	41.9	9.2		32.1	13.5 B	6.7		14.0	13.1 A	8.3	48	3.0	35.0 J	8.9		31.7	31.8
9.0		32.8	8.0	9.5		38.0	2.6	9.1		31.3	35.0	9.0		15.8	25.1	9.3		55.4	52.8 R
8.0	30	7.6	11.2 B	9.4	25	13.4	57.0	9.5		36.7	21.2	8.4	50	0.6	15.3	9.5	27	45.3	13.9
9.3		11.5	57.6	8.8	28	49.9	5.6 A	9.5		41.8	23.8	8.9		23.2	30.0	8.8	28	18.6	3.0
9.4		18.5	54.6	9.5	29	27.8	44.6	9.4		57.2	4.3	9.3	52	16.5	58.6	8.9	29	12.0	24.1
9.0	33	7.1	25.0	7.6	30	38.4	51.1 A	9.5	7	42.0	38.8	9.5		28.3	51.9	8.5	30	12.1	52.8
9.5		23.9	31.9	9.0	31	21.9	3.1	9.5		49.1	55.4	9.3	56	8.4	1.3	8.5		52.5	45.8
8.9	35	14.5	19.7 A	8.9	32	6.3	1.1 A	9.5	9	29.1	50.5	6.0		44.7	54.2 A	9.5	31	22.3	4.6
9.4	38	3.8	30.0	8.5		27.9	0.1 A	9.0	10	2.1	7.0 B	8.8		52.8	1.3 A	9.5		53.6	59.4
8.8	39	46.4	43.7 A	9.5	33	20.9	37.9	9.5		3.2	57.9	9.5	58	53.0	4.7	9.5	32	15.8	58.4
8.4	40	29.5	5.1 B	9.5		50.5	36.3	9.2		32.2	1.4	9.5	59	36.4	8.5	9.1		48.4	2.5 B
9.5		32.5	1.6	9.5		50.8	24.4	9.2		55.3	40.2	9.0	0	11.7	26.2	9.5	33	26.7	42.4
9.5	42	16.6	6.4	9.5	34	11.9	30.5	8.8	12	5.5	10.7 A	9.2		19.6	57.0	8.0		42.1	47.0 B
9.5		34.4	42.8	7.5	35	7.9	22.3 B	9.5	13	18.1	10.2	9.1		51.7	14.4	9.5	35	9.0	58.6

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	17ᵘ—18ᵘ	+56°			18ᵘ	+56°			18ᵘ	+56°			18ᵘ—19ᵘ	+56°			19ᵘ	+56°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	35 44.7	11.0		7.2	0 22.6	23.2	A	9.5	34 48.5	40.2		9.3	58 24.7	37.5	A	8.8	23 19.3	3.6	
9.5	48.6	15.6		7.5	53.3	54.2	L	9.3	35 4.7	29.0		9.2	59 30.5	10.6	A	9.5	42.2	22.5	
8.4	36 6.9	57.4	A	9.5	2 0.0	4.2		9.2	46.1	32.7		9.4	43.6	48.5		9.1	50.1	58.4	
9.4	14.8	43.5		9.0	15.8	47.8	A	9.4	50.5	29.7		9.5	59.7	8.2		9.3	53.9	23.4	B
9.4	39.1	10.0		9.3	4 30.0	20.3		8.8	38 31.2	38.9		7.8	0 13.7	23.1	A	8.3	24 8.3	35.5	A
8.4	37 12.1	9.1		9.5	30.0	35.9		9.5	45.0	48.7		9.4	46.3	0.7		8.6	24.1	48.0	R
7.0	28.7	56.6	A	9.1	31.7	5.6		9.1	40 13.5	4.1		9.4	1 22.4	40.0		9.3	26 38.0	49.9	
9.0	38 8.6	51.6	B	8.1	5 0.3	46.7	A	8.3	33.7	40.5		9.0	2 6.5	49.1	R	9.4	27 10.1	52.3	
9.3	17.3	55.8		9.5	49.6	7.3		9.3	38.1	27.0		9.5	7.3	44.8		9.0	16.4	58.1	
7.7	39 17.9	7.8	A	8.4	6 35.9	1.4	A	8.8	41 11.1	43.8		9.0	25.6	53.7		6.9	18.2	20.4	B
9.5	44.5	27.1		9.2	7 14.0	27.7	A	8.5	53.4	32.3		9.3	42.0	3.6	R	9.1	28.6	19.9	B
9.4	45.4	18.8		7.5	28.0	13.9	A	8.5	54.7	38.3		8.0	3 5.7	38.5	R	8.0	29.9	53.4	A
9.4	41 3.3	21.4	A	9.2	9 10.1	18.4		9.1	42 19.6	26.6		9.5	37.5	24.6		9.2	41.0	44.6	
8.0	31.6	15.5	A	9.4	14.3	41.6		8.2	22.3	56.6	F	9.1	46.2	8.2		9.1	50.8	47.6	A
9.5	57.0	49.6		9.5	28.0	23.9		9.5	31.8	2.8		8.5	4 32.7	21.6	A	9.4	28 22.5	52.0	
9.5	42 37.9	8.2		9.1	37.5	14.1		7.5	33.8	57.2	F	9.0	6 30.8	19.6	A	9.5	29 11.0	16.3	
9.2	43 10.6	26.5	A	8.9	47.8	42.3		9.4	43 11.0	34.8		9.5	34.1	12.1		9.2	27.7	5.0	A
9.0	19.6	4.4		8.9	11 24.7	41.8	A	9.5	25.9	23.4		9.2	38.9	5.7		9.5	30 4.3	41.6	
9.2	32.1	16.4		9.5	28.1	1.1		9.5	37.0	20.5		9.2	7 28.5	55.4		9.3	10.0	6.8	
8.3	44 5.4	11.8	A	7.0	12 10.5	32.6	A	9.5	42.0	20.5		9.2	29.6	48.1		9.2	48.0	20.2	B
8.8	45 17.6	21.8	A	7.5	13 1.6	50.0	A	9.5	43.8	47.8		9.0	45.4	29.1		6.7	55.8	8.9	A
9.5	41.7	53.8		9.5	18.4	56.0		9.5	44 15.8	42.7		9.5	48.8	24.6		9.3	31 20.5	58.4	
9.4	46 46.0	31.1		8.9	14 49.3	48.2	A	8.7	45 7.9	13.7	A	9.3	8 1.3	51.7		9.5	21.8	17.5	
7.5	47 4.7	52.3	A	9.3	16 26.2	30.3		9.5	44.8	5.3		9.3	4.0	56.7		9.4	27.7	23.2	
9.0	48 11.3	19.9		8.9	33.0	6.6	B	9.4	46 20.5	35.7		9.3	13.7	20.3	B	9.5	33.0	53.8	
9.4	18.2	55.0		9.1	44.5	7.7		9.5	47 9.8	34.3		9.4	29.8	57.0		9.4	48.8	13.9	B
9.5	18.7	41.0		9.5	17 10.0	49.3		9.3	29.2	8.8	A	8.5	45.9	12.1		9.4	59.3	5.6	A
7.2	49 8.0	9.0	A	9.3	10.4	8.3		8.7	50.0	27.2	A	9.1	56.6	16.6	R	9.3	32 1.2	40.6	
8.3	11.1	38.4	A	9.3	13.9	12.3		9.5	48 19.7	59.7		5.5	56.6	37.5	A	9.2	32.2	4.0	A
9.2	19.3	4.6		9.3	45.3	52.1		8.3	22.2	7.5	B	9.0	9 23.3	46.8		9.0	52.3	37.6	
9.1	50 52.2	18.3	B	9.5	59.7	51.0		9.0	30.9	27.2		8.7	10 22.7	42.5		9.0	33 0.2	45.6	
9.4	53.3	17.0		8.8	18 11.5	38.2		9.2	33.6	8.3	A	9.4	35.9	52.7		6.5	2.7	39.6	A
3.5	51 1.7	54.0	A	9.5	20 37.3	3.0		8.8	40.0	20.3	A	9.5	11 11.9	37.0		8.1	26.0	26.1	B
8.1	8.0	25.1	A	9.5	49.1	0.6		9.4	45.6	4.3		9.0	21.1	49.5		9.2	34 2.8	53.8	
9.5	29.8	39.4		9.0	22 43.6	55.4		8.5	49.3	57.7	A	9.1	46.9	9.5		8.4	16.2	5.3	
9.1	34.9	47.3	A	9.4	23 25.8	58.6		8.5	49 37.4	19.7	A	9.4	54.0	58.1		9.1	39.4	33.6	
9.3	52.5	56.6	A	8.9	38.3	33.6		9.1	52.2	42.9	B	8.9	54.9	56.3	R	9.3	35 7.5	59.4	
9.2	52 43.3	6.5	A	9.2	24 23.5	11.6		9.5	50 2.6	3.3		9.0	12 58.3	27.1		9.5	14.8	56.7	
9.5	49.6	20.3		9.3	23.7	5.0		9.0	23.5	12.7	A	8.1	13 8.8	10.6	B	9.0	42.7	59.7	A
9.5	51.2	46.2		9.1	58.0	57.1		9.4	53.0	38.5	A	9.3	14 43.4	13.6		9.3	36 27.0	45.6	
8.5	53 16.6	2.7	A	9.3	25 9.4	25.7		8.2	51 28.5	1.8	A	9.5	15 13.5	4.2		9.3	31.7	42.1	
9.0	54 13.3	53.8	A	9.5	13.6	16.8		9.1	33.2	26.4	A	9.1	28.9	31.0	A	9.5	37 16.6	59.4	
9.5	55 9.0	12.4		9.1	26 11.3	18.2		9.3	52 21.9	9.3		9.5	36.8	51.0		7.8	37.3	23.2	A
8.7	56 41.1	45.3		9.3	32.9	1.7		8.0	53 23.2	27.2	A	9.4	46.8	27.5		9.5	38 10.2	46.6	
9.2	53.8	43.6		8.9	27 24.0	0.5		9.0	54 5.6	51.1	A	9.1	57.4	2.6	A	9.0	15.5	13.2	
9.5	57 26.9	10.0		8.7	31.2	4.0		9.0	6.1	56.1	A	7.7	59.0	45.5	A	9.5	33.7	32.6	
9.2	30.5	3.3		8.7	45.7	43.2	A	6.8	15.2	32.9	A	9.5	16 2.8	26.9		8.8	56.8	46.1	
8.8	39.0	57.2	A	9.1	28 34.6	54.1	A	8.3	26.6	1.8		9.5	2.8	27.6		9.1	39 33.3	35.1	
9.2	42.6	41.8		9.3	45.4	57.1	A	9.4	35.1	52.1	A	9.0	22.1	51.0	A	8.8	47.6	48.2	
9.2	45.1	36.9		9.0	29 10.5	33.6	A	7.8	55 17.7	13.2	A	9.4	17 30.3	39.3	B	8.6	40 20.5	5.2	
8.4	59.7	27.3	A	9.2	44.1	56.3	B	9.5	37.0	32.4		7.8	32.1	36.0	F	6.3	42.0	40.6	A
8.2	58 47.2	57.9	A	9.5	30 0.5	38.8		9.4	56.5	39.5		8.8	47.8	59.1	A	9.2	42.0	43.6	
9.5	50.4	50.5		5.4	4.0	56.2	A	8.6	56 3.9	18.5		9.5	19 11.3	45.1	B	9.2	59.3	56.8	
9.5	59 4.8	32.0		9.4	8.0	9.8		9.5	57 13.3	37.5		9.5	32.0	12.1		9.3	41 27.3	23.2	
9.5	9.6	42.3		9.0	25.5	3.0		9.4	22.5	42.5		9.1	41.9	58.9	R	9.0	48.9	26.2	
9.5	16.9	28.0		9.5	55.2	29.9		8.6	26.2	45.0	A	8.3	56.6	37.5	R	9.3	42 10.5	23.7	
9.5	20.2	20.1		9.4	31 42.6	30.7	A	8.6	45.2	19.7		8.3	59.8	19.6	R	8.0	19.4	59.8	
9.1	0 13.8	22.0	B	9.2	32 10.3	16.7	A	9.0	54.4	35.6	A	8.0	20 8.3	43.8	S	9.5	43 10.1	25.6	
9.5	14.0	39.4		9.5	47.8	38.6		9.5	58 8.5	14.1		9.5	21 42.4	16.1		9.2	17.5	28.4	B
8.0	21.2	25.3	A	9.4	34 10.0	56.4		9.3	10.1	3.2		9.0	54.5	54.0		9.3	24.8	27.2	

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	19h—20h	+56°			20h	+56°			20h	+56°			20h—21h	+56°			21h	+56°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	44 15.2	24.2		8.7	5 57.8	29.5		6.6	22 52.8	10.0	S	9.3	40 33.1	11.8	B	9.0	8 3.0	1.2	
9.1	18.1	1.6		9.4	6 14.0	29.4		8.8	55.8	9.5		9.1	47.8	10.1		9.2	9 12.0	32.1	B
7.5	29.0	44.6	G	9.5	17.9	21.8		9.5	23 11.4	38.6		9.5	41 7.5	52.9		9.5	22.8	23.6	
7.0	30.0	32.6	G	9.0	35.6	31.5	B	9.3	56.2	20.6		7.9	11.7	16.4	A	9.4	31.8	9.9	
9.0	50.7	52.3		8.9	39.7	31.9		9.4	24 4.0	38.0		9.3	42.0	51.4		9.5	10 0.3	50.7	
7.2	45 29.6	8.2	B	9.2	7 8.0	46.7		9.2	19.8	47.5		9.1	44.8	28.3		9.5	26.5	26.5	
9.3	35.3	11.9		7.4	25.5	57.4	A	8.6	33.6	54.3		9.3	56.3	13.2		7.5	27.0	16.9	B
9.0	37.8	40.6		8.4	47.6	51.5	A	9.5	47.4	5.8		7.2	42 39.0	18.3	A	9.5	11 2.5	57.0	
8.5	49.7	30.7		9.3	8 2.4	1.1		9.3	25 3.2	8.8	B	9.0	44 34.5	15.9		9.5	48.2	43.5	
9.4	46 47.5	3.4	A	9.5	41.7	40.7		8.5	21.8	26.2		9.5	45 13.9	18.2		9.2	54.5	48.7	B
9.1	47 24.2	14.2	A	9.5	44.2	32.1		9.5	29.3	16.5		9.2	14.1	12.6		7.3	13 15.1	9.6	A
9.0	29.7	4.3	A	9.1	46.2	28.8		9.5	26 23.7	10.8		8.2	41.5	28.3	B	9.2	22.4	3.0	
9.3	40.2	10.9	A	9.2	48.0	20.5	B	9.5	23.8	40.7		9.5	48.5	55.5		9.5	38.9	11.1	
9.2	45.8	44.6		7.6	57.4	22.0	A	9.5	43.9	52.6		9.5	46 20.0	39.6		8.8	47.7	44.6	A
9.2	48 5.4	58.8		7.4	9 4.6	57.1	A	8.8	46.1	24.7	B	6.8	30.1	15.6	G	9.5	14 50.5	21.5	
9.5	42.1	1.3		4.5	10 2.2	7.5	A	9.5	59.9	21.2		8.6	43.8	28.2		9.5	15 4.9	35.4	
9.3	59.7	34.7		9.5	32.0	43.1		9.5	27 1.1	30.5		9.2	57.5	8.6		9.3	28.7	46.2	
9.5	49 25.0	58.3		9.5	39.0	36.3		9.0	39.6	44.0		9.5	47 5.8	56.0		9.5	37.0	52.9	
9.0	50.5	10.3	A	9.5	42.1	31.4		8.2	42.9	53.9	B	9.4	5.8	24.7		9.5	16 53.3	46.0	
8.4	50.7	31.1	A	9.5	11 34.9	45.5		8.4	43.7	24.6	F	8.9	36.9	31.1		8.3	17 51.2	4.3	
9.4	50 58.5	39.1	A	9.3	43.8	35.3		8.6	48.3	5.0		8.0	48 2.0	17.6	G	8.3	55.3	43.1	P
9.3	51 38.6	21.9		8.5	12 6.4	26.0		8.4	57.1	57.6	B	9.4	22.1	38.3		8.8	18 5.0	54.8	
9.2	52 15.0	9.9		9.3	37.8	21.8		9.5	59.9	44.3		8.3	37.9	17.0	G	9.5	5.1	40.1	
9.5	30.0	55.8		9.1	45.7	5.4		6.3	28 13.8	17.2	G	7.4	52.7	3.2	A	8.0	7.0	56.7	B
9.5	37.0	56.8		9.3	13 16.1	12.4	B	9.3	34.0	41.1		9.2	49 0.0	4.2	B	8.5	17.6	12.7	
9.5	42.3	57.8		9.5	25.8	40.9		9.5	56.6	12.3		8.0	4.9	26.8	A	9.5	24.9	25.8	
9.3	49.0	50.8		9.4	27.6	44.9		9.0	29 26.0	42.0		8.8	27.6	54.5	A	9.4	19 5.0	54.8	
8.8	57.0	22.2	A	8.1	40.5	27.2	P	9.3	30.8	36.0		8.3	34.9	19.3	A	9.5	28.9	16.7	
8.0	58.1	30.2	A	9.4	59.7	7.3		9.1	59.1	1.3		6.8	50 12.6	36.8	A	8.0	20 7.4	50.5	B
9.3	53 4.7	54.3	B	9.5	14 21.4	7.5		9.5	30 2.8	25.0	R	9.3	31.9	42.6	B	9.0	21.6	59.3	
6.3	10.8	17.7	A	8.1	27.1	50.1	B	9.0	45.2	37.3		9.4	51 6.9	57.8		9.0	39.6	56.2	B
9.5	56.0	14.8		9.5	15 25.5	4.0		9.1	31 13.8	48.0		8.5	23.4	21.3	A	9.4	21 36.5	17.2	
9.4	54 6.4	56.9		9.3	34.1	8.6		9.5	30.6	19.0		8.8	25.2	17.3	A	9.5	39.3	31.2	
8.9	53.1	9.5	A	8.8	16 4.7	3.3		9.4	42.8	45.8		9.4	26.9	8.0		8.5	22 16.5	43.2	A
9.5	55 2.9	24.4		9.5	7.8	6.3		9.2	32 9.9	50.9		6.0	52 24.0	19.4	A	9.1	22.9	49.5	
9.0	56 30.7	44.8		8.2	11.5	12.9	A	9.5	33 27.1	42.0		8.3	49.4	22.3	A	9.5	49.0	38.0	
9.1	37.6	52.9	A	9.4	21.7	1.2		8.9	34 27.5	6.2	A	9.5	53 5.4	3.5	B	9.5	23 7.1	38.0	
9.1	38.2	55.2	A	9.2	44.1	3.4		9.5	36.5	4.7		8.8	6.3	17.4	A	8.1	21.0	42.1	A
9.5	57 9.0	0.8		9.3	17 2.7	6.1	B	9.5	45.1	2.9		9.5	54 14.8	27.8		9.2	24 21.3	32.8	
9.5	58 57.8	19.4		8.8	4.1	21.8		9.5	35 1.3	42.3		9.5	55 58.4	40.0		8.2	43.5	4.8	A
9.1	59 2.2	42.4	B	9.5	12.1	7.5		8.0	5.8	54.5	A	9.5	56 54.6	55.7		8.2	25 21.9	33.2	A
9.1	3.4	26.3		9.5	36.4	42.2		8.0	6.9	4.7	A	9.0	57 13.9	14.5		8.8	32.6	47.8	A
9.5	45.7	14.4		9.5	46.2	6.8		9.5	24.1	16.7		6.5	58.4	29.1	G	9.5	26 3.9	1.8	
7.2	48.7	40.6	B	9.4	18 30.7	3.9		9.0	54.7	30.8		5.8	58 10.4	5.4	A	8.5	25.3	32.6	A
9.1	59.9	9.1		9.5	19 38.7	50.2		8.4	36 18.2	46.3		9.0	59 14.8	20.1	A	8.9	31.5	19.3	
9.0	0 17.1	4.5		9.5	20 11.8	5.0		8.8	37 11.2	40.0		8.9	0 7.9	50.9		9.5	54.8	38.2	
9.3	17.2	1.5		9.4	38.4	4.2		9.5	19.8	13.0		8.7	27.8	29.5	A	9.5	57.5	3.8	
9.4	1 5.0	55.4		9.5	45.1	23.8		9.5	24.5	23.3		9.5	1 35.6	59.3		9.5	27 7.5	13.2	
9.3	25.5	8.9		9.5	21 3.0	42.4		9.0	46.4	4.1	A	9.5	2 24.4	11.6		7.5	18.4	51.7	A
9.1	30.8	16.1	B	9.5	13.4	0.9		9.3	49.3	2.7		9.4	3 26.4	4.8		8.0	28 7.9	53.7	A
9.5	2 41.1	13.8		9.1	19.8	43.3		9.5	51.3	54.0		9.4	31.1	58.0		9.3	26.0	20.2	
9.4	3 15.7	0.5		8.2	25.1	50.0	B	9.4	56.8	59.3		9.0	51.0	51.4		9.3	29.1	58.6	
8.9	42.2	57.0		8.4	31.4	20.4		8.6	38 13.8	6.5	A	7.5	5 9.3	37.9	G	9.0	37.0	44.6	
7.9	4 17.8	15.6	A	9.0	46.6	58.7		7.0	40.2	52.1	A	9.5	14.0	56.4		9.0	29 27.6	38.7	A
9.3	26.3	42.4		9.1	47.2	45.4		9.0	40.8	25.6		9.5	35.5	56.4		8.9	30 15.3	49.7	A
9.2	29.1	4.7	A	9.4	55.0	6.7		9.3	59.8	56.1		9.1	41.2	34.0	B	9.4	55.9	53.0	
9.2	41.5	9.0		8.4	22 0.3	45.7		6.7	39 33.8	35.5	G	9.0	6 30.4	35.0		9.4	31 7.3	28.3	
9.4	45.9	11.9		9.5	12.0	6.2		9.5	46.0	34.5		8.7	49.8	6.4		8.5	18.3	49.1	A
9.5	5 31.9	16.4		9.5	12.0	25.0		9.4	40 8.8	47.2	B	9.5	7 35.4	34.0		9.5	30.6	43.2	
9.5	44.0	53.0		8.2	48.7	46.8	B	9.5	20.3	45.0		9.0	55.6	7.7		8.6	35.9	49.4	A

2601—2660				2661—2720				2721—2780				2781—2840				2841—2900			
	21ʰ	+56°			21ʰ—22ʰ	+56°			22ʰ	+56°			22ʰ	+56°			22ʰ	+56°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	31 37.8	39.6		9.4	49 33.1	45.6	B	8.6	4 58.6	45.5	A	8.0	22 23.5	49.4	A	8.8	37 14.3	35.9	
9.5	56.7	57.2		8.7	50 3.1	39.9	A	9.4	5 0.3	5.4		9.5	37.3	20.9		9.4	14.3	32.9	
9.5	32 3.5	1.5		9.5	51 1.9	39.2		9.0	45.1	12.7		9.0	49.5	58.3		9.2	17.0	37.3	
8.8	13.1	51.0	A	8.5	17.4	20.7	A	8.3	47.2	23.5	A	8.4	59.3	55.4	A	9.5	38 41.2	52.1	
8.2	19.4	55.7	A	9.4	52 7.7	16.2		9.4	50.5	54.7		8.0	23 7.0	10.9	A	8.7	43.3	38.8	
9.0	39.6	55.3	A	9.4	53 10.5	31.1		9.4	6 0.0	48.7		9.4	39.5	23.5		9.4	54.9	39.9	
9.3	51.3	48.4		8.5	54 13.3	14.8	A	6.0	34.2	7.4	G	8.4	41.8	28.2		9.5	56.5	13.8	
9.0	33 2.9	12.7	A	9.3	25.9	42.6		9.5	36.1	59.1		8.5	54.2	58.6	A	9.3	39 6.6	41.1	
9.0	11.8	21.5		8.8	26.3	49.4	A	9.3	55.4	1.7		9.4	24 17.0	42.4		9.3	12.5	43.3	
8.5	12.9	54.7	A	6.7	32.8	57.4	A	8.5	7 11.3	55.6	A	8.5	23.0	2.3	A	8.8	15.0	33.6	R
9.3	16.3	15.9		7.3	37.6	10.3	A	9.2	17.6	7.5		9.1	24.5	3.6	A	7.9	32.0	22.7	B
9.5	45.3	28.2		8.9	42.7	34.1		9.5	20.9	34.5		9.5	31.9	9.7		9.0	35.4	40.6	
9.1	52.5	35.6	A	9.5	54.3	51.0	A	8.5	25.1	33.1		8.4	41.0	15.2	A	9.0	40 25.3	24.5	
8.0	55.6	19.8	A	9.5	55.8	45.2		9.0	41.6	1.5	R	7.1	49.6	28.9	A	8.6	26.4	55.3	
9.0	34 5.3	43.6	A	8.0	55 7.4	1.5	A	8.8	8 10.2	57.4	A	8.5	56.2	6.5	A	9.0	27.8	8.0	
9.3	11.3	34.6		8.0	42.4	0.8	A	8.2	19.1	55.3	A	9.5	25 2.0	4.0		9.2	37.9	10.5	A
6.2	29.8	49.7	A	9.5	46.5	48.8		9.4	47.9	24.1		9.0	16.5	40.8		9.5	39.4	4.4	
8.9	30.9	17.7	B	9.5	56 12.7	46.0		8.8	9 33.6	8.9	A	9.5	26.4	2.7		8.0	41 3.0	4.4	A
8.9	52.1	59.9	B	9.2	21.9	8.2		8.5	37.6	59.3	A	8.8	48.8	30.0	A	8.5	21.5	50.1	
8.0	53.5	49.6	A	9.5	32.6	47.3		9.3	40.9	35.0		9.5	26 23.7	5.2		9.5	24.5	47.3	
8.5	54.7	39.5	A	8.8	51.6	57.9		5.1	43.5	19.3	A	9.4	31.5	1.2		9.5	29.3	30.7	
9.5	35 51.5	49.6		9.1	56.0	46.4		9.4	46.0	47.6		9.5	44.2	23.1		9.1	30.1	27.2	B
7.3	53.0	55.7	A	9.5	57 14.0	59.9		9.3	49.6	16.0	B	9.5	51.7	56.7		9.3	32.3	28.1	
9.0	36 28.3	28.7	A	9.4	22.5	9.4		9.2	49.6	21.8	A	9.3	27 29.4	13.2		9.1	47.7	23.8	
9.5	58.0	13.8		9.5	31.5	57.7		9.4	10 10.0	10.1		9.4	53.1	6.0		8.6	47.9	53.4	A
9.5	37 1.0	2.9		9.3	41.0	8.0		6.5	11 13.1	30.0	A	9.2	28 8.3	34.6		9.2	51.6	32.9	
9.5	21.3	59.0		9.0	49.6	26.1		9.1	15.0	33.7	A	9.3	52.0	38.6		9.2	53.0	2.9	
9.3	27.8	53.7		9.4	59.0	11.0		9.5	30.0	32.4		8.8	29 4.2	37.2		9.5	42 9.5	20.7	
9.5	45.4	25.5	B	9.5	58 13.6	45.1		9.3	35.2	27.1	A	9.5	13.1	25.1		9.4	31.6	58.9	
9.5	38 17.2	58.2		9.0	20.1	30.1		9.3	53.3	54.3		9.2	13.2	30.1	B	9.5	43 1.7	32.9	
9.2	17.8	20.8	A	9.2	21.7	38.3		9.5	12 35.7	59.0		9.4	26.7	51.8		9.0	6.5	9.0	A
8.8	47.6	21.7	A	9.3	28.2	51.7	A	9.3	44.1	15.7		9.5	59.0	1.0		8.5	11.5	3.9	A
8.8	39 6.6	16.7	A	9.5	59.0	43.7		9.2	13 40.9	58.2		8.7	30 1.8	14.4	G	9.5	36.2	23.3	
8.5	55.9	47.6	A	8.9	59 3.3	51.4	A	9.5	43.0	51.8		7.8	4.6	7.0	G	9.4	43.5	2.2	
9.5	40 16.8	27.1		9.0	36.4	7.0		6.7	14 46.3	11.8	G	8.5	14.0	38.7	A	9.5	59.6	56.7	
8.5	39.8	59.3	A	9.4	42.2	48.3		9.5	52.0	50.4		9.5	25.1	22.0		9.5	44 4.4	29.4	
9.3	40.6	21.4	B	9.2	43.0	17.1		8.6	57.2	4.6	R	9.5	31 7.2	28.2		9.5	10.4	24.8	
9.5	53.3	26.6		9.2	54.2	20.5	A	9.4	15 19.7	23.6		8.9	15.0	9.4	G	9.5	23.1	38.6	
9.4	41 37.5	51.7	B	9.4	0 8.5	43.2		9.4	23.2	36.2		9.5	20.6	55.2		9.5	40.3	28.2	B
9.0	42.2	15.2		9.4	14.0	42.7		9.5	53.8	15.9		9.5	32 12.7	6.3		9.1	45 19.5	25.6	B
9.5	46.7	57.4		9.5	35.1	29.3		9.5	16 11.6	57.2		6.0	56.5	2.7	G	9.5	21.9	25.8	
9.2	59.6	37.6		7.5	37.9	25.2	A	8.2	24.8	3.5	F	9.5	33 22.7	47.4		9.2	24.6	38.0	
9.5	42 24.0	57.5		8.8	50.8	50.7	A	9.4	17 5.5	30.6		9.5	50.9	51.3		9.4	26.6	39.3	
9.5	40.0	37.1		9.4	58.4	56.2	B	9.0	28.4	43.0		9.3	57.0	0.2		9.5	27.7	28.1	
9.5	40.2	44.6		9.3	59.2	41.9		6.7	39.6	33.0	G	8.5	34 6.5	37.8	P	9.5	35.0	14.1	
9.4	56.7	30.7	R	8.5	1 32.1	30.0		8.9	44.0	2.7	B	9.3	15.5	34.2		9.0	38.4	39.5	
9.5	43 9.0	31.6		8.8	34.0	56.5	A	8.9	47.5	2.6	B	9.3	17.9	39.0		9.5	55.6	9.2	
9.4	47.9	41.3		9.5	2 5.0	7.1		9.5	18 16.9	16.2		9.4	30.7	19.5		8.8	46 0.1	18.7	
9.5	44 39.0	58.8		9.2	52.6	18.2	A	9.5	31.6	10.8		8.8	35 8.2	4.6		9.5	0.2	35.9	
9.5	45 26.1	26.8		9.3	56.6	43.7		9.5	37.0	55.0		9.5	28.6	56.9		7.8	8.6	57.4	B
9.5	42.0	17.4		9.4	3 36.5	0.8		9.5	43.3	9.3		9.5	35.5	39.8		9.1	47		
8.2	46 40.4	54.7	A	9.2	38.6	6.7	A	9.5	19 4.5	22.4		9.4	45.7	10.4		9.4			
9.3	50.7	51.7		8.3	4 0.1	20.3	A	9.5	27.6	45.7		9.2	45.8	9.6	B	9.5			
9.5	47 21.4	15.5	B	9.5	5.7	48.7		9.2	48.2	26.0		9.0	36 21.0	19.3		8.1			
9.2	48 27.7	22.5		9.5	6.9	41.6		9.5	20 8.5	6.7		9.2	33.5	19.0					
9.5	34.1	51.8		9.5	9.0	48.7		8.6	21 27.9	27.9	B	7.9	33.8	51.0	F				
8.9	50.5	21.6	B	9.3	18.0	49.7		9.1	29.4	54.8		9.2	35.5	2.7					
9.5	58.2	21.4	B	9.4	26.7	44.2	B	8.5	41.6	45.4	A	8.5	38.0	40.8					
9.4	49 32.1	29.6		9.4	33.6	46.3		9.5	22 11.0	22.6		8.8	43.0	15.1					
9.4	33.0	25.2		9.0	39.7	40.5	A	9.0	11.1	33.8		9.4	50.5	10.5					

2901—2949				2950—2998				2999—3047				3048—3096				3097—3145			
	22h—23h	+56°			23h	+56°			23h	+56°			23h	+56°			23h	+56°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.5	49 36.4	28.2		9.5	1 20.0	56.4		7.0	17 33.4	44.5	G	9.5	31 32.3	39.2		9.5	43 31.6	38.0	
9.4	46.3	56.8		9.5	45.1	42.4		9.4	18 2.0	19.5		9.5	45.9	24.5		9.5	43.7	14.5	
9.4	47.0	49.3		7.5	2 8.1	23.9	R	9.1	10.9	2.5		9.5	51.8	6.1	B	9.5	44 2.0	53.2	
9.2	50.1	29.7		8.6	18.6	7.6	R	8.6	33.7	3.0		8.4	53.3	11.4	A	9.3	15.8	18.0	
9.5	55.9	30.5		9.5	56.2	59.8		9.5	47.5	22.3		9.5	32 0.2	46.6		8.2	28.2	24.0	B
8.5	55.9	15.6		9.5	3 38.0	51.1		9.5	48.6	41.0		9.3	2.7	20.4		9.4	37.0	55.3	
9.2	50 6.6	8.3		8.5	48.7	3.6	R	9.5	19 25.2	58.4		9.0	3.3	16.6	A	9.5	45 16.5	16.2	
8.6	12.7	3.8		9.3	50.5	41.1	B	9.4	29.8	3.6		8.3	37.0	19.6	A	9.2	40.2	4.5	
8.4	19.8	6.3		7.0	51.9	40.1	J	9.5	46.7	18.7		9.5	33 0.7	39.0		9.1	46 23.2	10.4	
9.5	32.1	28.5		8.2	4 11.7	14.6	B	9.3	59.4	22.1		9.4	50.2	33.1		8.0	25.8	1.2	A
9.2	49.0	57.6		9.4	28.8	44.9		8.0	20 0.0	5.1	P	9.1	51.2	31.0	A	9.5	29.7	11.7	
9.5	52.6	49.5		9.0	43.2	22.8		9.1	29.4	25.1		9.5	34 10.2	3.6		9.4	35.7	36.6	B
9.1	51 5.6	54.5		9.0	5 24.7	19.1	R	9.2	21 46.3	23.6		8.2	15.5	45.1	A	9.3	43.5	7.8	
9.2	15.4	51.6		8.7	6 4.8	17.0		9.5	22 0.5	41.4		9.2	24.7	28.0	A	8.7	55.0	23.7	A
7.7	23.6	14.1	A	9.1	13.3	11.4		9.0	52.7	36.3		9.4	31.0	5.2	B	5.0	47 10.6	41.2	A
9.5	47.0	3.4		9.5	18.8	8.7		9.5	53.7	34.1		9.1	38.8	4.8	A	8.4	39.5	9.0	A
9.4	52 31.1	22.8	B	6.0	19.1	22.1	B	8.0	23 5.4	0.4	F	9.5	44.5	48.3		9.0	50.7	17.9	
9.4	47.5	50.7		9.5	26.5	20.8		9.5	48.6	59.9		9.1	47.0	5.9	A	9.5	48 14.4	24.9	
9.0	53 5.6	5.8	A	9.4	36.6	9.5		9.4	24 2.8	51.4		9.4	55.2	10.4		7.5	16.3	37.9	A
9.4	17.2	25.9		8.0	44.5	40.3	B	8.5	46.5	40.3		6.8	57.3	27.9	A	9.5	26.4	13.3	
9.4	20.5	48.2	B	9.1	7 7.5	34.3		9.4	25 17.7	4.4		9.4	35 1.8	11.5		9.5	50.9	54.2	
9.4	55.0	52.0		9.5	15.2	1.0		9.5	17.7	25.0		9.1	24.2	16.3	A	9.5	50 11.6	36.8	
6.0	54 0.9	10.0	A	9.3	41.2	12.1		9.5	43.3	59.9		8.7	31.3	28.8	A	7.7	29.1	19.4	A
9.4	10.3	43.4		9.5	8 49.6	8.8		9.0	56.4	42.8		9.5	43.8	33.5		8.3	33.1	36.2	A
9.5	55 15.5	2.3		9.4	57.2	31.1		9.2	26 6.2	49.1		9.4	49.2	36.2		9.5	35.0	56.9	
9.4	21.3	14.2	B	9.4	9 12.8	26.4		9.5	10.0	1.0		9.5	52.2	32.0		8.5	36.5	17.0	A
6.1	24.6	19.6	A	9.5	19.2	35.8		7.5	28.2	36.7	J	9.3	55.4	11.4		9.5	56.5	14.4	
9.4	27.3	12.8		9.5	58.0	39.6		9.5	51.8	34.6		9.5	36 6.0	32.3		9.5	58.0	53.4	
9.4	37.8	15.9		7.2	10 26.4	51.8	A	9.5	27 3.0	11.2		9.5	37 12.0	33.3		9.5	51 42.8	3.3	
9.3	57.9	45.7		9.2	11 35.3	59.4		8.5	3.2	25.5	A	8.7	12.4	58.9	A	9.1	45.8	9.5	
9.4	56 5.7	25.1	A	9.5	37.9	27.9		9.4	8.4	30.2		8.0	24.0	57.4	A	7.4	52 8.2	52.2	A
9.5	11.6	12.7		9.4	53.6	49.4		9.1	24.2	43.0		9.5	38 1.1	27.0		9.2	19.5	25.2	
8.8	28.5	19.0	R	9.5	12 13.4	9.0		8.8	28.1	25.3	A	8.4	22.9	34.0	A	8.3	57.3	2.8	A
9.0	34.6	21.9		9.5	13 0.0	17.9		9.1	40.7	48.6		9.3	36.0	47.7	B	9.5	53 12.5	58.9	
8.4	48.5	32.2	A	9.5	13.1	44.3		9.5	28 0.1	0.9		9.5	46.2	41.1		9.5	41.6	3.4	
9.5	55.6	14.1		6.7	19.6	27.4	A	9.5	13.0	23.0		9.5	46.7	43.2		9.5	54 2.6	14.4	
9.0	57 14.9	46.9	A	9.4	23.0	10.4		9.4	32.8	39.4		9.5	55.2	41.7		9.4	49.0	27.3	
9.0	15.9	50.4	A	9.5	29.4	2.5		9.4	50.5	1.2		6.0	39 57.5	38.7	A	9.0	55 18.0	59.9	
9.5	58 23.3	21.3		9.5	37.7	57.6		9.0	29 6.2	29.4	A	9.5	40 2.2	0.4		9.4	25.5	20.8	
9.2	50.5	17.1		9.4	14 10.0	7.6		9.4	11.5	10.7		9.4	4.4	59.9		9.3	41.9	50.3	
9.5	59 8.6	1.2		9.3	14.1	3.3		8.3	30 13.2	56.7	A	9.5	6.0	22.9		8.9	56 5.9	47.8	B
9.4	30.4	13.3		9.5	17.6	25.7		9.0	20.2	5.2	B	9.3	7.8	4.6		8.0	25.6	34.8	R
9.4	41.9	34.4		9.4	51.2	23.5		9.3	22.5	0.6		9.5	19.8	33.1		8.1	42.5	6.8	B
9.4	53.9	19.0		9.4	15 59.5	35.5		9.4	42.0	5.4		9.5	26.9	51.5		9.5	57 20.1	39.3	
9.3	0 5.8	32.7	B	9.0	16 41.0	23.1		9.0	50.8	17.6		9.4	29.8	4.1		8.3	31.2	39.7	B
9.1	12.0	46.1		9.2	59.5	51.7		8.7	55.2	42.4	A	8.8	41 29.3	53.6		8.5	39.3	57.5	
9.2	15.8	47.0		8.8	17 0.4	17.8		9.4	31 0.9	6.7		9.0	47.9	25.0		8.8	58 1.1	29.4	
9.2	24.8	55.4		9.2	11.3	51.0		9.5	14.3	24.9		7.9	43 16.3	21.3	B	9.4	59.5	32.3	
9.5	31.4	59.2		9.2	24.9	33.2		9.4	15.0	12.4		9.4	26.5	35.6		9.4	59 3.8	19.9	

Zone +57°

1—40				41—80				81—120				121—160				161—200			
	0h	+57°			0h	+57°			0h	+57°			0h	+57°			0h	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	0 16.0	6.9		9.4	7 25.0	26.1		9.5	18 59.9	10.3		9.5	30 36.4	28.1		9.5	42 59.1	36.0	
9.5	34.6	9.3		9.5	26.1	37.2		9.5	19 7.0	40.1		9.5	39.0	13.6		9.3	43 53.0	45.8	
9.5	43.5	57.1		9.5	8 7.8	5.8		9.5	11.9	41.6		9.3	31 0.2	36.0		9.1	55.7	48.1	
9.0	1 15.8	46.2		8.5	10.7	32.0	L	9.5	19.5	11.7		9.5	49.6	4.7		9.5	45 28.8	56.1	
9.0	22.5	45.3		9.2	25.3	21.6		7.3	43.9	45.0	L	9.1	32 19.8	38.5		9.5	46 20.7	46.5	
9.4	37.0	5.4		9.5	31.4	15.6		9.4	20 6.0	46.0		9.5	33 3.4	1.4		9.5	26.4	36.5	
9.5	41.5	0.5		9.5	43.0	49.4		9.3	7.3	43.2		9.5	23.9	36.5		9.3	31.0	42.5	
9.5	44.9	15.6		9.5	9 2.9	49.8		9.5	24.4	25.6		9.0	34.8	25.9	B	9.3	53.7	16.1	R
8.1	50.0	51.5	B	9.2	16.2	52.8		9.5	21 0.2	20.1		9.4	34 6.5	54.7		9.5	55.8	12.2	
8.5	2 5.5	35.7		9.4	42.8	4.7		9.5	10.8	4.1		7.9	9.4	46.5	B	9.3	47 9.3	0.4	
9.1	16.7	44.0		9.4	42.8	12.8		9.5	21.5	12.2		9.3	11.5	4.1		9.5	21.8	43.0	
9.3	29.0	58.8		8.5	46.7	52.2		9.5	38.9	37.5		6.5	12.5	57.5	B	7.0	35.5	11.2	A
9.5	47.3	28.1		9.3	10 19.4	12.2		9.1	22 16.4	23.6		9.4	31.3	59.8		9.5	48 52.7	0.3	
9.5	49.0	24.0		9.5	33.2	15.1		8.9	56.5	38.6		9.5	35 6.1	47.9		9.5	49 11.7	42.5	
8.5	50.4	43.0	B	9.5	35.4	23.6		9.4	23 20.5	9.2	B	9.4	7.7	2.2		9.4	50 11.3	16.6	
8.1	51.2	41.0	B	9.5	47.1	1.2		8.6	36.9	15.3	A	9.5	8.8	37.6		9.5	51 27.6	6.8	
9.5	53.0	27.8		9.5	55.9	33.6		8.4	38.8	21.6	A	9.0	37 4.2	40.5		8.8	28.7	51.4	
8.9	3 1.0	56.2		9.1	12 3.5	47.0		7.1	24 17.8	32.3	B	8.5	15.3	14.1		9.1	33.5	23.1	
8.9	6.0	56.0		8.9	25.4	16.1		9.0	25 12.4	49.0		9.5	50.2	57.7		7.0	52.2	35.0	G
9.5	7.0	24.8		9.0	32.9	3.8	A	9.5	38.0	37.5		9.5	38 15.0	11.1		6.8	53 5.9	2.4	L
8.0	10.0	12.7	B	9.3	54.1	2.3		9.5	44.9	32.0		9.5	18.0	9.0		9.0	43.3	36.5	
8.6	10.5	58.1		9.5	13 2.0	49.8		9.0	45.5	24.6		9.4	32.9	21.6		9.5	54 1.5	5.5	
9.1	22.5	2.3	A	8.8	6.1	2.6	A	9.5	26 5.0	0.7		9.4	39.7	13.8		9.5	10.1	3.5	
9.1	33.3	6.7	A	8.7	17.9	5.5	A	8.9	5.0	6.7		9.3	52.8	41.5		9.0	12.2	28.0	
8.9	51.8	1.0	A	9.5	20.7	2.2		9.5	57.2	45.0		8.9	39 18.7	13.7	R	9.0	19.4	13.6	R
8.9	54.0	4.7	A	9.3	36.4	15.1		8.2	27 18.9	52.8	A	9.0	28.5	21.6	R	9.3	46.3	28.0	
8.7	58.6	26.5		9.5	55.5	2.2		9.5	21.5	42.5		9.4	29.8	14.2		8.5	55 4.2	22.6	
7.5	4 1.2	24.3	B	9.4	14 1.3	38.0		9.3	28 9.9	18.6		9.4	57.3	41.9		7.6	40.7	11.7	A
8.4	16.7	24.3		7.8	2.0	10.3	A	8.3	15.9	1.3	A	8.8	40 11.9	46.1	B	9.0	41.7	8.7	A
9.4	19.0	7.7		9.1	15 31.9	25.1		9.3	21.5	31.6		3.8	21.7	2.4	S	8.0	49.6	14.7	A
9.5	52.5	2.7		9.0	49.8	49.0		9.2	22.1	42.7	B	8.5	30.6	12.2		9.5	54.0	46.5	
9.5	5 4.6	50.5		9.0	16 23.2	44.6	B	8.4	25.9	42.5	A	9.1	33.0	25.0		9.4	56 21.3	4.6	
9.5	48.5	18.6		9.5	50.1	44.6	B	7.0	29 8.8	13.1	J	9.0	36.4	38.2	B	9.3	57 35.0	29.1	
9.5	6 1.0	49.9		8.9	50.9	36.5		9.1	24.7	56.3	B	9.4	36.9	35.2		8.9	39.2	54.9	B
9.5	10.0	47.0		9.3	17 13.8	44.0		9.5	25.2	10.7		9.4	51.0	0.5		9.0	44.7	36.5	
9.5	7 3.1	7.5		9.5	40.0	54.9		9.5	29.6	49.1		8.5	41 30.9	58.2		9.0	51.9	58.3	
9.3	5.0	3.0		7.5	50.3	10.0	L	9.4	36.4	59.3		9.5	42 5.3	43.0		8.9	55.2	59.1	B
9.0	8.8	48.5		9.5	18 6.5	43.0		9.1	46.4	45.3		7.9	17.4	57.2	B	9.2	58 11.5	8.4	
8.7	13.3	59.1		9.5	10.3	32.1		9.4	30 6.6	55.0		8.8	18.7	57.8	B	9.1	24.4	5.7	A
8.9	13.5	4.1	B	8.5	30.4	10.2	L	9.5	15.3	43.8		9.5	48.5	9.2		6.5	59 42.7	29.2	

201—260				261—320				321—380				381—440				441—500			
	1ᵘ	+57°			1ᵘ	+57°			1ᵘ	+57°			1ᵘ	+57°			1ᵘ	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.5	0 1.7	6.7	A	9.5	11 9.1	32.8		9.4	24 6.4	17.5		9.5	35 27.1	27.8		9.1	49 50.6	58.4	
9.5	22.0	6.5		9.4	17.6	48.6		9.5	12.6	31.2		9.2	36 5.4	7.3		9.5	56.3	39.6	
8.4	23.2	38.6	A	9.3	18.6	32.9		9.3	25.5	47.4		9.2	17.3	24.0		9.4	50 24.9	40.7	
9.3	35.8	17.1		9.5	31.7	12.5		8.8	29.0	44.0	R	9.5	20.3	40.0		9.5	36.8	14.4	
9.4	1 8.3	11.1		9.4	41.9	34.1		9.2	38.6	1.8	B	9.3	27.4	16.4	B	9.3	38.5	59.9	
9.5	31.9	32.4		9.5	43.4	30.2		9.5	25 3.1	59.9		9.5	30.2	11.6		9.2	40.9	10.0	
8.7	45.7	20.0	A	9.5	12 15.0	5.7		9.3	9.8	57.7		9.4	32.8	4.0		8.0	43.7	49.6	A
9.4	50.7	5.1		9.3	55.1	37.5		8.6	11.2	26.4	B	9.4	41.3	10.2		9.0	47.7	48.1	A
9.5	2 1.9	19.5		8.2	13 3.6	31.7	A	9.5	29.7	26.4		9.0	37 7.6	17.1		9.5	59.0	39.0	
9.4	9.7	8.6		8.7	7.5	29.9	A	9.5	31.9	34.1		9.0	34.3	49.0		9.1	51 5.8	2.8	A
9.5	42.7	54.9		9.5	33.0	28.1		9.1	26 9.8	47.8		9.1	37.6	0.8	A	8.3	14.7	29.7	A
8.9	46.6	31.9	A	9.5	14 1.3	39.3		9.2	18.8	25.4		7.0	40.4	17.5	L	9.5	21.4	12.2	
9.5	48.2	54.5		9.5	8.7	18.4		8.5	24.9	45.2	R	9.5	38 25.4	38.0		8.9	23.1	0.4	A
8.9	54.0	49.4		7.0	10.5	23.1	A	9.4	33.9	24.7		9.4	30.2	14.1		9.5	31.9	54.0	
8.9	54.5	53.8	B	9.5	20.1	56.2		9.0	36.0	27.3		9.5	36.0	17.7		9.0	36.7	26.2	
8.8	59.7	28.6	A	9.0	46.8	26.6		9.5	51.0	13.0		9.3	45.0	26.6		8.6	38.5	43.0	A
9.4	3 21.9	47.4		8.5	15 15.2	6.3		9.3	27 6.2	3.4		9.4	49.7	9.6		8.6	39.6	44.4	A
8.7	26.0	27.9	A	9.0	18.1	58.5	A	9.5	9.2	36.4		9.2	49.9	1.0	A	9.5	52 37.4	52.1	
9.0	29.9	21.3	A	9.4	41.0	32.3		9.5	11.1	26.2		8.2	54.7	43.9	L	9.3	46.6	25.1	
9.5	4 11.3	23.8		8.5	58.2	29.4	R	8.8	28.0	41.2		9.3	56.2	59.0		9.5	51.0	45.3	
8.7	20.7	53.5		9.4	16 43.3	4.9		9.5	44.3	30.5		9.5	39 54.8	49.4		8.4	53.0	19.1	B
9.5	32.1	20.2		9.3	51.0	46.5		9.4	48.6	0.9		9.5	40 22.5	46.8		9.0	55.2	11.8	
8.6	32.8	6.6		8.7	17 30.5	1.0	B	7.5	54.7	53.8	J	8.8	30.3	48.5		9.3	58.1	53.5	
8.2	5 17.6	31.4	A	9.5	39.4	22.3		9.2	57.2	53.9	J	7.9	41 6.0	44.9	A	9.4	53 12.0	0.0	
9.5	33.4	41.0		9.4	45.5	17.4		9.1	28 7.4	41.2		9.5	20.1	7.6		9.3	13.5	6.7	A
9.0	36.2	12.4		9.5	18 5.4	51.3		8.6	14.8	9.6		9.5	48.0	7.7		8.5	16.6	31.0	A
9.0	38.6	9.8	A	9.5	8.0	51.8		9.0	29.0	25.6	B	8.6	42 6.7	54.6		9.2	24.1	56.8	
9.2	43.8	6.8		9.0	40.5	36.0		9.5	34.9	22.3		9.5	20.6	47.4		9.3	35.4	9.8	A
9.5	54.3	27.8		9.5	52.4	59.0		6.0	41.0	14.0	J	9.1	27.0	42.9		9.0	54 4.7	47.2	
9.5	6 21.8	43.0		9.5	19 2.1	58.2		9.1	53.0	57.1		9.5	34.8	32.2		9.5	12.5	13.2	
9.1	23.9	20.1		9.5	3.9	57.8		9.5	58.4	58.4		9.4	36.1	18.5		8.2	23.8	19.0	A
9.4	27.7	6.0		9.5	9.1	3.4		9.4	29 2.5	23.4		9.5	59.7	28.6		9.5	24.7	50.8	
9.0	51.8	2.6	A	9.4	9.6	3.0	A	9.5	7.5	2.5		9.5	43 4.9	0.5		9.4	49.5	11.4	
8.9	7 23.7	18.4		8.0	12.1	4.0	A	9.4	9.6	53.8		9.5	20.8	23.5		9.1	58.5	10.3	A
9.5	41.8	52.8		9.2	13.3	47.3		9.3	16.7	6.5		9.5	26.9	37.1		9.1	55 1.5	4.1	
9.5	8 58.5	3.2		8.5	29.8	35.6	R	9.5	28.4	58.1		9.1	35.3	10.8	A	9.0	3.6	41.2	A
7.0	9 13.8	2.1	A	9.5	44.0	47.9		9.5	32.5	2.2		9.3	36.6	2.9		9.3	38.0	4.3	
9.5	19.7	36.0		9.0	20 1.3	30.1		9.5	48.6	37.4		9.5	44 12.5	58.0		9.5	56 23.3	50.2	
9.2	24.7	55.5	R	9.5	24.5	4.0		9.4	30 11.5	5.6		9.5	13.0	18.7		8.8	46.4	26.5	
9.0	28.2	36.5	R	9.5	28.8	50.2		9.5	12.2	45.7		9.5	25.4	45.5		9.4	51.3	15.2	
9.4	36.5	59.2		9.5	39.4	36.1		9.5	15.9	40.5		9.5	42.0	55.4		9.5	52.6	7.0	
9.1	39.7	38.9	R	8.9	50.0	13.7		9.0	34.2	13.6		9.5	59.8	5.1		9.0	56.7	3.9	
9.3	49.7	26.6		9.5	21 17.7	55.8		9.5	43.1	28.6		9.4	45 7.7	1.9		9.0	57 0.2	49.6	
9.2	51.5	0.1	A	9.1	23.0	28.8	A	9.3	31 4.9	4.2		8.4	8.9	34.1	A	9.5	12.7	22.2	
9.3	55.7	20.0		9.5	38.8	38.7		8.7	36.5	38.1	R	9.0	23.4	11.0	A	9.4	16.1	13.2	
9.4	10 4.3	28.5		9.5	47.4	46.0		8.7	40.6	36.3	R	9.0	47.6	15.4	A	9.5	33.4	52.6	
9.4	6.2	35.2		9.5	56.9	4.1		9.4	58.9	3.2		9.1	53.9	38.8	B	8.4	41.5	57.7	A
9.5	16.2	32.5		8.3	22 5.0	26.0	A	9.1	32 4.7	42.2		8.9	46 18.6	15.3	B	8.8	41.5	34.1	
9.5	16.8	32.3		9.1	5.9	49.8		9.1	7.8	41.7	B	9.5	25.5	27.5		8.8	43.0	45.1	
9.1	17.1	8.7	A	9.1	18.3	52.7		6.8	42.6	53.8	L	9.3	46.7	4.2	A	8.5	49.1	34.4	B
9.5	27.7	30.2		9.1	21.9	53.3		9.4	48.3	13.3		9.5	52.9	5.6		9.3	52.6	39.1	
9.2	28.8	29.3		9.5	28.5	25.5		8.7	49.7	33.1	R	9.5	54.1	56.4	B	9.0	53.4	1.0	
9.5	30.6	33.6		9.5	41.7	31.8		7.5	33 25.5	23.3	L	9.4	47 48.2	27.4		9.3	57.2	28.2	
9.5	36.3	29.0		8.8	55.2	40.3	R	9.2	46.1	32.2		8.5	48 12.3	15.2		6.5	58 36.3	44.1	L
9.0	39.1	54.1	R	8.4	23 4.0	13.2	A	9.0	34 22.6	30.5		8.1	28.0	9.3	L	9.0	42.0	50.5	
9.5	45.7	11.6		8.7	11.0	31.2	B	9.5	46.0	2.0		9.1	30.8	11.5		9.4	55.2	57.2	
7.9	47.7	26.4	A	8.9	17.6	36.7		9.5	57.3	36.7		8.3	37.2	24.1		9.5	57.4	3.4	
8.8	48.8	32.7	A	9.2	27.0	30.6		9.0	35 0.9	12.7		9.3	46.4	58.6		8.5	59 0.0	14.4	
9.4	54.0	11.4		8.4	31.8	52.0		9.0	6.4	6.8		8.7	49 2.2	3.9	L	8.4	21.8	17.4	
6.1	11 0.4	28.1	A	6.5	24 3.3	34.8	L	9.5	25.4	12.6		9.2	31.2	53.8		9.5	22.2	46.2	

501—560				561—620				621—680				681—740				741—800			
	1ᵘ—2ᵘ	+57°			2ᵘ	+57°			2ᵘ	+57°			2ᵘ—3ᵘ	+57°			3ᵘ—4ᵘ	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.4	59 26.4	16.2		9.5	14 27.0	45.5		9.5	33 13.7	2.2		8.3	51 41.0	2.1		9.0	34 12.7	50.7	
8.5	30.4	24.6		9.5	28.0	37.3		8.8	23.6	41.0	A	9.4	52 29.3	58.1		9.0	14.9	7.0	
9.0	43.0	21.3		9.5	32.8	4.6		8.0	41.2	10.8	A	8.7	53 36.5	0.5	A	9.5	30.8	37.5	
9.5	57.2	52.6	B	9.5	37.0	43.5		9.5	52.7	55.4		9.3	37.2	9.6		9.3	47.5	3.6	
9.5	0 19.3	1.4		9.5	47.1	50.9		9.5	34 8.8	2.0		8.7	54 36.6	9.1	A	9.3	35 17.2	16.5	B
9.1	39.1	45.6		8.1	15 3.1	31.4	L	9.4	15.8	1.8		9.4	55 1.5	31.7		9.3	36 39.2	50.7	
9.5	44.6	8.5		9.0	16 8.2	18.0		9.5	16.3	47.1		9.5	15.8	16.5		8.4	50.6	18.7	A
9.5	45.0	19.2		7.0	25.1	1.8	A	9.3	16.5	51.5		9.3	19.7	41.9	B	9.4	38 1.2	55.1	
9.4	1 30.9	35.9		9.4	50.9	20.0		8.7	17.7	54.9		9.5	42.0	38.9		9.0	39 43.1	23.7	
9.4	51.0	31.5		9.3	17 0.0	12.1	A	8.5	44.8	1.2	A	9.3	56 1.6	45.0		9.5	56.6	57.1	
9.3	2 1.1	38.9		9.5	28.0	25.8		9.4	56.8	32.2		9.5	6.7	7.6		9.5	41 47.0	59.6	
9.0	12.8	15.1		9.0	19 13.9	28.3		7.2	36 11.2	7.0	A	9.4	13.3	8.4	B	6.0	59.3	31.0	A
9.2	27.5	25.2		9.0	15.0	50.9		9.5	18.5	55.8		9.4	14.0	6.8		9.2	42 39.1	7.5	A
9.5	28.6	42.9		9.5	16.5	21.4		8.0	42.0	3.0	A	9.3	29.3	8.5	B	9.4	43 13.2	17.8	
9.3	36.3	0.3		9.2	22.7	31.3		9.5	52.4	28.8		8.5	57 19.1	34.0		9.0	18.6	46.8	
9.5	53.7	23.3		7.0	33.1	10.2	L	7.8	37 36.6	35.3	B	7.3	40.4	47.0	A	9.1	44 16.3	14.3	
9.5	58.5	52.2		8.6	37.0	59.9		9.4	38.1	1.2		8.5	56.0	46.7	A	8.5	30.0	28.6	L
9.5	3 17.2	12.6		8.7	43.2	8.6		8.2	56.7	11.5	A	9.4	58 20.5	35.7		8.8	58.1	20.5	B
6.6	31.1	52.7	A	9.5	48.8	1.2		9.0	38 8.4	48.0		9.5	24.8	49.9		9.4	45 37.5	16.5	
9.2	32.0	45.2		6.5	20 58.1	21.8	L	7.8	13.3	25.4	B	9.1	59 4.1	34.2	A	7.0	47 8.0	1.1	L
8.8	4 0.2	14.0	A	9.4	21 7.6	34.7		8.8	22.5	24.2	A	8.8	0 3.0	31.9	A	8.9	32.1	34.0	A
7.5	47.3	47.8	A	6.8	26.9	2.8	L	9.5	37.9	1.7		7.9	20.6	20.4	A	8.7	48 25.2	28.0	A
9.1	59.1	39.2	A	8.3	22 17.1	58.5		8.0	44.0	17.0	A	8.7	40.5	37.6	A	9.3	49 47.6	14.3	
9.1	5 0.8	28.8		8.2	25.5	19.0		9.5	39 6.8	46.5		9.1	55.6	7.2	A	9.5	56.0	10.4	
8.4	31.0	5.0	A	7.5	35.1	48.5	S	9.5	25.9	9.7		9.5	2 7.0	27.3		9.1	50 3.6	29.6	A
7.8	45.1	36.7	A	9.5	50.8	56.8		9.5	42.9	55.2		9.4	49.1	51.3		9.5	51 23.5	53.0	
8.8	55.4	4.0	A	9.5	23 16.3	43.5		8.9	40 15.2	14.8		9.5	4 23.4	8.8		9.3	23.6	44.5	B
8.5	59.7	45.0	A	9.4	30.5	11.3		9.5	43.8	5.3		9.2	5 1.6	12.6	B	9.3	38.8	39.4	A
8.7	6 28.8	32.3		8.7	37.4	45.8	B	9.5	44.9	28.8		9.2	19.6	13.1		8.0	42.6	17.9	A
9.4	49.5	58.2		9.4	24 39.4	17.5		9.2	49.9	37.1	A	9.0	6 4.1	38.1		9.3	49.4	1.0	
8.2	54.1	57.6	B	7.9	25 4.2	51.8	R	6.2	55.1	41.5	A	9.0	51.9	48.3		9.4	52 23.1	15.9	
9.4	7 0.1	27.3		9.5	16.5	50.3		9.3	41 7.9	39.9	B	9.5	52.5	57.5		9.5	53 51.8	56.5	
8.0	21.8	21.4	A	9.4	20.0	9.5		9.5	15.8	5.0		9.3	7 59.8	20.7		9.4	54 0.0	59.1	
9.0	44.2	41.5		7.5	39.4	25.8	R	9.5	38.7	54.3		9.1	8 27.7	49.6		9.5	40.2	11.9	
6.2	48.2	13.4	A	8.7	43.6	5.2		9.5	42 34.1	43.0		8.0	9 36.2	20.6	B	9.3	56 28.7	31.0	B
8.7	8 5.7	8.2	A	9.3	54.4	24.5		9.5	43 12.6	8.7		9.2	10 2.6	55.1	A	9.4	57 2.3	16.4	
9.0	13.1	54.9		9.5	57.7	16.4		9.5	32.8	41.4		9.4	53.9	42.0		9.5	46.2	57.1	
9.5	9 8.2	41.8		9.5	26 2.4	8.4		9.3	44 19.8	52.5		8.8	57.7	34.7	B	9.2	58 36.1	28.1	
9.5	10.8	36.9		8.2	5.8	5.0	L	9.3	45.3	16.5	B	9.3	11 35.0	56.4		9.2	59 53.4	0.0	
9.5	27.7	58.0		8.7	12.2	29.0	B	9.0	50.5	7.6		8.0	12 26.5	56.7	A	8.7	0 16.3	47.5	B
9.1	27.8	0.0	A	9.5	27 16.1	16.5		9.0	45 1.6	36.6		9.0	13 2.3	55.1	A	9.2	16.7	54.5	
9.0	10 10.2	19.7		8.4	28 4.8	10.6	A	8.5	7.1	24.8	A	9.1	45.2	39.3		9.3	50.6	45.2	
9.5	14.1	54.8		9.4	12.1	12.0		9.0	7.5	28.7		9.1	15 27.1	32.0		9.5	1 52.1	17.4	
9.2	22.0	29.7		9.5	24.3	56.3		9.5	8.6	40.9		8.5	28.6	45.8	A	9.4	2 10.7	23.7	
8.9	25.1	7.2	A	8.0	29 7.3	52.2	A	8.0	29.3	20.4	A	8.0	17 6.7	9.9	A	6.5	3 10.6	5.5	L
9.3	51.8	49.3	B	8.1	14.8	2.9	A	8.4	46 13.5	46.5		9.5	18 34.5	52.1		9.4	4 46.8	33.3	B
9.4	11 6.1	52.1		9.5	31.7	8.7		9.4	47 27.5	58.5		9.2	19 49.3	59.0	A	6.0	5 10.5	29.1	A
9.5	8.7	45.0		9.0	30 7.0	52.5	A	9.2	48 9.4	2.5		9.4	22 6.6	59.2		9.5	6 24.6	29.1	
8.5	25.0	54.1	A	9.5	11.5	3.6		8.9	13.2	10.6		8.0	6.6	45.3			8 27.2	12.8	
8.5	26.5	11.1	A	8.4	25.2	11.2	A	9.5	26.1	26.8		7.0	14.6	22.2	B		51.7	4.7	
9.2	12 13.7	29.3		9.5	40.6	15.0		9.3	44.5	52.6		9.0	24 23.4	20.2				26.6	A
8.8	32.1	54.9		9.5	40.9	59.2		7.1	54.6	4.7	B	9.3	25 15.2	19				23.6	A
8.0	57.0	26.3	A	9.0	48.3	34.7		9.1	49 2.9	26.3		9.5	54.3	5[illegible]				[illegible]	
8.7	13 35.1	11.1	A	9.5	31 37.0	28.3		9.3	28.6	54.0		8.9	26 50.6	[illegible]					A
9.3	39.8	24.2	B	8.5	46.8	57.5	A	9.0	35.1	50.8	B	9.4	27 7[illegible]						A
9.2	41.9	0.8	A	8.0	32 16.2	34.7	A	9.4	50.1	34.1		9.0	28 3[illegible]						
9.5	45.0	51.3		9.5	18.6	4.1		9.0	59.0	41.0		8.5	30 1[illegible]						L
9.4	14 4.6	39.7		9.5	28.7	11.6		8.1	50 44.3	44.9	B	9.4	31 [illegible]						
9.1	11.1	3.3	A	8.0	41.6	49.6	A	9.4	51 10.9	28.2		8.0							
9.4	26.0	42.0		8.5	58.5	12.1	A	8.9	18.7	15.0		8.5	34						L

801—860				861—920				921—980				981—1040				1041—1100			
	4h	+57°			4h—5h	+57°			5h—6h	+57°			6h	+57°			6h—7h	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	15 25.5	12.6		9.5	59 36.0	12.0		9.4	44 28.0	29.5		8.7	21 9.0	7.7	A	9.0	58 32.1	3.4	A
9.5	16 6.9	50.7		9.5	0 15.9	11.8		8.3	39.0	17.1	A	9.1	22 15.0	49.5		9.4	49.5	30.6	B
9.1	48.3	12.1		9.4	1 11.5	57.2		8.8	45 45.8	51.8		8.8	16.0	3.4	B	9.5	59 0.3	26.6	
9.1	17 30.0	12.6		9.4	19.1	58.5	B	9.0	46 5.4	32.8		9.2	32.1	0.0		8.0	17.5	56.5	A
9.5	18 37.8	53.9	B	9.2	21.1	51.7	B	9.0	49 3.3	50.9	A	9.0	24 37.3	13.2		8.0	38.0	45.5	A
8.5	41.8	4.8		9.5	22.1	47.8		9.2	51 23.0	27.9	A	9.5	47.4	36.2		9.5	56.3	28.4	
8.7	19 40.3	52.9	A	9.4	2 11.1	18.9	B	9.4	47.4	43.1		9.3	51.5	29.8		8.9	0 10.1	53.3	
9.5	57.0	8.7		9.5	32.4	27.7		9.5	48.0	4.3		6.7	25 57.0	18.0		9.1	32.8	13.7	
8.3	57.8	31.8		9.4	3 33.8	55.7		9.4	52 4.4	17.1		9.0	26 15.2	22.0		8.0	56.7	4.9	A
9.3	20 12.5	53.0		9.0	49.5	11.3		9.2	8.8	43.3	B	9.5	41.5	40.6		9.5	1 56.8	34.9	
8.8	35.2	58.8	A	9.5	4 36.5	13.9		8.2	23.0	50.9	A	9.0	27 40.6	52.2	B	9.2	2 30.2	17.6	
9.5	21 6.5	39.6		9.5	5 15.4	58.7		9.5	54.2	38.7		9.5	52.7	30.3	B	8.2	50.7	30.8	A
9.4	25.6	4.8		8.7	6 32.2	57.0		8.9	53 1.2	2.0	A	9.4	30 16.6	48.5		7.5	3 5.8	32.8	A
9.5	45.7	46.0		6.5	59.9	57.1	A	9.0	1.5	29.9		9.0	24.0	17.9	A	9.3	22.7	15.9	B
9.5	49.0	54.5		9.1	7 47.5	10.0		8.3	50.9	16.8	B	9.0	43.0	28.9	A	8.0	4 36.5	54.6	A
9.5	22 6.0	39.1		9.2	8 3.0	51.7		9.5	54 43.8	49.5		9.2	56.2	36.2		9.0	5 3.8	32.1	
6.8	23 2.0	6.8	A	9.5	9 10.9	6.5		9.4	55 1.8	43.8	B	9.0	57.0	7.7		9.5	6 6.5	36.8	
8.8	4.4	52.8		9.3	10 4.5	16.3		9.1	34.5	50.6		9.0	31 18.0	25.4	A	8.5	8 28.9	7.8	
9.0	25.1	3.8	A	5.3	11 3.9	24.1	A	9.0	36.0	0.0		9.0	50.0	15.9	A	9.5	9 52.8	26.0	
9.5	32.7	17.6		9.0	44.6	37.9	B	9.5	56 19.3	44.1		8.6	32 1.3	13.8	A	9.5	10 16.3	11.8	
9.5	42.6	44.5		8.9	14 20.8	40.8		9.2	23.0	4.8		7.2	4.0	3.3	A	8.5	34.6	11.8	A
8.7	24 33.4	1.8	A	8.3	27.0	19.3	P	8.9	57 31.5	26.3	A	9.0	53.1	38.1	A	8.9	11 19.3	25.3	A
9.5	26 24.0	18.6	A	9.1	34.4	57.9		9.5	59 0.0	14.6		8.0	34 9.2	55.9	A	8.2	19.6	14.8	A
9.5	27 1.5	37.7		9.5	15 29.5	58.0		9.0	4.3	2.7	B	6.1	26.8	18.6	A	8.1	26.8	51.2	A
9.4	28.0	57.4		9.4	16 40.0	10.4		8.1	7.3	2.9	B	8.5	49.3	24.9	A	9.2	12 4.4	45.2	
8.6	38.4	47.0		8.9	50.6	44.7		9.2	0 30.0	51.9		8.7	55.6	47.8	A	9.1	49.2	30.5	B
8.6	28 36.5	3.8		9.5	17 22.4	14.9		7.7	2 12.5	48.2	B	9.4	36 1.8	56.5		9.5	58.5	56.9	
7.3	40.4	35.2	A	9.3	18 58.1	36.6	B	9.3	26.1	33.9		8.3	38 1.1	1.8	B	9.2	13 6.7	41.2	
9.2	41.9	20.5	A	6.6	20 11.4	6.7	A	9.3	35.9	31.3		9.3	5.0	35.3		9.2	7.5	15.2	A
8.0	56.7	38.2	A	9.2	21 44.5	53.3		9.3	3 9.8	4.3		8.5	26.3	21.6	F	9.4	56.4	30.0	
8.8	29 12.0	37.2	A	8.1	59.4	44.8	A	9.4	4 19.6	52.3		8.2	31.0	47.8	G	9.5	14 8.0	38.7	
9.3	54.1	5.4	B	9.2	22 16.3	51.1		7.0	55.6	27.4	B	8.0	39 39.8	18.6	B	8.9	18.5	1.0	A
9.0	30 48.0	20.5		9.3	18.7	41.9	A	9.0	5 52.2	29.3	A	9.1	40 3.8	31.4		9.5	43.1	8.8	
8.8	31 12.5	59.1		9.5	23 45.4	33.5		8.3	6 26.5	11.2	A	9.1	10.1	51.5	A	8.7	45.0	26.5	A
9.3	17.0	31.2		9.5	24 18.0	34.0		9.5	42.6	51.5		9.5	29.9	31.4		8.4	16 22.0	56.7	B
9.0	32 39.7	30.3		9.2	35.4	2.0		9.4	54.8	2.2	B	9.2	44 21.3	33.8		8.4	17 11.2	56.7	B
9.3	53.1	0.9	B	9.2	53.5	7.1		9.5	8 45.5	12.2		6.3	49.2	43.7	G	9.3	18.0	16.6	B
9.0	34 52.0	32.2		9.3	25 27.2	2.2		9.1	9 32.8	37.6		9.5	46 9.8	34.3		9.0	31.7	52.2	A
9.5	35 6.5	36.2		9.3	32.0	2.6	B	8.5	54.0	28.4		8.7	19.0	45.5	G	9.5	45.2	23.1	
9.5	27.0	39.1		7.8	34.8	58.9	A	9.5	10 17.9	57.3		9.4	26.4	20.4		8.4	46.8	15.7	A
9.5	39 7.4	30.3		8.9	27 34.0	2.0		9.2	23.0	37.1		8.3	27.3	48.5	G	9.5	19 53.5	13.2	
9.5	30.3	32.7		9.3	28 2.4	4.0		9.0	33.5	8.2		8.9	35.7	18.6	B	9.4	57.7	21.1	
9.5	40 26.6	33.5		9.5	5.3	52.0		6.9	45.3	2.4	G	9.3	47 57.3	25.0		7.6	21 57.3	33.8	B
9.4	43 32.0	13.5		9.2	43.0	59.9		8.0	11 6.8	25.0	B	9.0	48 1.9	0.0	A	9.2	22 12.3	54.5	A
8.8	44 14.8	54.1	A	9.5	59.2	40.4		9.5	13 4.0	57.0		9.1	40.9	2.5	A	7.5	24 47.4	9.8	A
8.0	32.1	51.2	A	9.5	29 49.0	15.4		8.5	15 42.1	39.1		8.4	44.3	47.1	A	8.0	48.5	53.0	A
9.0	45 54.5	3.8		9.5	31 0.1	57.0		9.5	58.4	15.6		9.5	49 4.4	26.0		8.0	25 6.9	46.1	A
9.2	47 0.0	0.3		9.4	59.6	14.7		9.4	16 20.8	46.0	B	9.5	50 11.5	2.4		9.3	26 32.5	29.9	
8.4	55.0	40.6	A	9.5	32 19.5	1.4		9.3	40.3	29.8	B	9.2	23.1	55.9	A	9.3	27 7.8	43.8	B
9.1	50 22.5	31.2	A	7.8	24.6	9.8	A	9.0	17 15.2	40.6		9.2	25.8	23.5		9.3	18.0	41.3	
9.5	57.0	46.0		9.0	35 3.0	44.1	A	9.3	27.8	10.7		9.5	51 45.8	18.6		9.0	37.9	6.9	
9.5	52 22.9	15.1	A	9.1	36 10.4	3.9		9.2	18 4.4	45.8		9.4	52 0.6	40.3		7.5	28 5.5	34.9	A
9.4	53 6.0	33.2		9.0	11.7	17.4		9.2	31.3	57.4		9.5	23.3	31.4		6.3	48.0	24.5	A
9.1	54 6.8	41.0		9.3	16.3	11.8		9.1	19 46.0	7.7		9.5	53 40.0	59.9		9.5	30 15.2	58.7	
8.8	55 3.0	37.7		9.5	37 3.4	18.1		9.5	46.8	21.8		9.5	54 27.8	3.4		8.4	27.2	7.9	
9.5	56 25.5	53.3		8.3	38 15.5	13.3	A	9.1	20 11.0	24.4		9.0	46.4	23.5		9.5	43.8	41.3	
7.8	30.3	13.5	L	9.1	39 19.0	0.0		9.0	11.4	55.8	B	9.5	56 19.3	31.4		8.5	31 5.5	50.6	
9.5	50.9	54.2		7.3	40 53.7	55.1	A	8.3	13.8	56.2	B	8.5	57 6.9	19.6		8.5	32 4.0	8.8	L
9.3	58 59.5	0.7		9.4	42 48.8	59.0		9.0	16.5	49.3	B	7.8	58 11.3	34.8	A	9.3	19.9	35.4	
8.8	59 31.0	10.9	A	9.5	43 28.2	21.1		9.2	43.9	33.8		9.3	31.4	20.1		9.3	55.5	16.2	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	7ᵘ—8ᵘ	+57°			8ᵘ—9ᵘ	+57°			9ᵘ—10ᵘ	+57°			10ᵘ—11ᵘ	+57°			11ᵘ—12ᵘ	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	33 30.0	18.5		9.5	29 13.5	31.5		9.4	23 25.0	16.0	A	9.0	28 26.4	40.0		7.8	45 55.4	7.3	A
9.0	34 52.6	7.4	A	8.3	30 27.0	11.9	A	8.8	24 13.1	12.6	A	8.3	29 11.1	50.7	G	9.3	46 51.1	43.7	
9.3	36 21.0	31.9	A	9.5	31 57.4	0.9		9.5	25 15.1	50.5		9.4	31 31.4	17.9	A	6.0	48 24.1	23.6	A
8.9	52.4	12.8	A	9.5	33 12.9	5.0		6.8	26 16.5	36.7	A	9.5	33 21.1	48.4		9.5	49 35.7	4.0	
8.0	57.4	8.3	A	8.7	34 16.0	35.4	R	9.5	27 38.0	30.3		9.5	26.2	22.4		8.1	47.5	55.4	B
9.5	37 39.0	59.5		8.5	16.5	48.6	R	9.5	28 38.0	53.6		5.8	34 34.4	56.8	A	8.7	53.2	44.1	B
9.3	38 15.9	18.6		9.4	27.5	8.4		9.4	30 53.2	19.0	A	9.5	35 2.9	40.1		9.5	51 11.0	10.3	
9.3	40 4.6	24.0		8.8	28.0	25.9	R	9.1	31 15.5	57.0	A	9.5	36 16.8	43.0		9.5	55 28.5	45.2	
9.5	7.8	36.1		7.7	41.0	57.3	B	9.3	44.6	35.4	A	9.3	18.7	39.6	A	9.4	56 56.2	33.8	
7.5	33.0	22.8	B	9.2	56.5	25.9	R	9.4	34 42.6	21.0		6.8	54.8	39.7	A	9.5	57 18.8	21.1	
9.5	42 0.0	52.1		9.5	35 53.6	10.9		5.0	36 14.6	47.0	A	9.5	38 40.4	11.6		9.5	21.5	36.2	
9.4	43 2.5	31.4		9.5	37 43.5	53.1		9.1	37 20.2	53.8	B	9.0	41 4.6	19.0		8.8	22.5	37.7	A
9.5	46.4	18.6		9.5	38 23.5	35.5		9.0	51.2	30.7	A	7.5	42 8.0	0.4	A	9.4	32.7	39.1	B
9.4	45 25.5	0.0	B	9.4	25.0	48.9		7.8	39 13.5	54.0	A	6.1	14.2	21.0	A	8.8	58 13.9	48.0	A
9.1	46 20.4	5.9	A	9.5	39 30.2	53.1		9.5	57.7	47.0		9.4	24.3	27.0	B	9.3	0 7.0	18.8	
9.4	49 5.8	34.8		8.7	41 38.0	4.5	A	9.0	44 10.0	7.3	A	9.2	45 25.8	29.8		8.6	40.0	22.5	
8.5	36.5	20.1	A	9.1	42 12.9	22.6		9.2	45 55.2	34.7		9.3	47 59.1	23.8		8.4	3 56.5	29.5	
6.5	50 45.4	40.2	A	8.3	54.0	49.2	L	9.2	48 36.2	53.0		9.5	48 46.2	12.0		9.3	4 12.5	58.9	
9.2	53 56.4	37.2		8.2	43 54.3	57.8	L	8.6	49 4.1	36.7		9.5	50 28.9	38.0		6.5	30.4	52.2	A
9.1	54 30.0	12.6		9.5	44 48.5	0.1		7.5	36.6	9.1	P	9.0	51 24.1	47.9		8.9	47.5	54.4	A
9.5	56 22.9	19.0		9.0	45 19.7	10.8	R	9.4	47.1	44.6		9.0	33.8	13.1		9.5	6 40.6	22.1	
9.5	45.1	25.4		6.7	52.2	25.6	A	5.0	51.1	29.8	G	2.3	53 5.5	9.6	A	9.5	7 34.9	4.5	
8.5	58 35.8	57.6		9.3	46 12.9	57.1	R	8.9	50 42.7	39.5	B	9.2	54 39.8	25.3	A	3.3	8 13.5	50.5	S
9.1	40.7	52.7		9.4	28.0	47.9		9.5	51 54.5	42.1		9.3	55 9.3	57.8	B	7.5	9 41.0	6.3	A
9.5	2 37.0	18.5		9.3	48 34.1	38.0		7.8	52 27.3	57.4	A	9.4	20.7	56.6		9.4	11 32.8	56.4	
9.4	3 42.4	37.2		9.1	49 27.7	2.7		7.8	53 26.6	21.9	F	8.3	56 4.6	46.5	A	8.7	47.9	10.7	A
9.2	4 30.0	38.7		9.5	50 0.5	23.1		9.5	56 18.1	47.5		8.0	57 59.1	48.5	A	9.2	12 3.4	44.7	A
7.8	31.8	32.3	B	9.5	51 46.8	16.7		9.5	57 26.9	57.4		9.2	1 52.1	17.4		9.3	13 14.4	37.3	A
8.9	34.9	30.1		8.7	52 51.1	54.3	A	8.8	40.0	57.8	A	7.3	4 19.1	11.4	B	9.1	14 15.5	47.5	A
9.5	8 1.0	45.6	B	9.3	53 0.5	7.6		9.0	0 16.4	54.2		9.5	5 45.6	58.8		9.3	50.7	40.2	
7.6	40.3	45.1	A	9.4	54 0.4	56.6		9.0	3 13.1	7.2	A	9.5	7 52.3	6.1		9.4	16 6.6	10.8	
8.2	9 14.4	24.1	A	9.3	55 23.2	38.0		9.3	54.5	36.8		9.5	8 35.7	18.0	B	8.8	18 1.9	57.9	
9.4	10 16.3	57.5	B	9.0	32.9	42.0	A	9.5	4 24.2	31.0		9.5	10 1.3	14.6		6.4	5.5	33.9	G
7.9	25.0	4.7	B	8.7	44.4	53.3	A	9.4	27.9	44.4		9.0	48.4	5.4	A	8.8	20 17.5	40.2	A
7.9	42.1	18.2	L	9.5	52.0	3.4		9.3	54.2	4.3		8.3	11 52.0	24.0	A	8.8	21 3.0	57.9	
9.0	12 12.5	51.4	A	9.5	57 22.5	48.6		9.4	5 43.3	37.9		6.5	13 30.6	52.5	A	8.2	22 40.8	8.4	A
8.0	12.5	52.4	B	9.0	39.2	41.3		9.4	6 11.1	14.2	B	9.5	43.0	2.5		9.2	23 53.7	51.3	A
9.5	13 49.0	26.9		9.5	40.8	0.0		8.4	32.4	14.8	A	9.3	14 28.4	18.7		8.5	25 46.3	46.2	F
8.2	16 8.8	11.5	A	9.5	58 2.5	10.7		8.2	43.2	28.8	A	9.3	16 56.5	40.2		9.3	28 16.8	9.3	A
9.3	12.0	24.4	B	9.5	34.5	28.0		8.5	7 4.3	37.6	A	9.5	17 6.9	6.8		9.2	46.9	18.3	A
9.1	22.9	40.7	A	9.4	59 15.1	35.4		9.2	58.9	31.8		9.5	9.5	58.8		7.8	29 7.2	22.0	A
8.2	49.8	4.2	A	9.2	56.7	26.8		9.5	10 5.8	58.4		9.5	18 42.8	16.5		7.5	28.3	37.7	A
7.1	17 29.1	8.8	A	9.5	0 15.7	55.0		8.9	27.6	20.4		7.8	19 24.7	22.5	A	8.4	30 15.3	27.9	A
9.4	29.6	55.9		8.9	31.9	28.1		9.5	11 35.1	8.2		6.5	21 34.4	31.9	A	9.2	33 6.8	58.0	
9.3	49.9	24.8	B	9.4	56.4	44.8		9.5	12 20.5	20.4		8.6	22 13.4	43.2	A	9.0	46.2	34.9	A
9.5	18 15.7	29.1		9.0	1 20.5	23.6	A	8.0	14 3.1	15.0	A	7.2	35.1	32.4	A	9.4	59.8	15.2	
9.1	19 12.8	53.4		9.5	50.0	9.3		9.3	33.2	52.4	A	7.2	23 19.2	56.8		9.4	59.8	35.4	A
9.4	46.1	34.1	B	7.0	59.1	32.1	A	9.5	16 45.5	20.9		9.1	55.1	51.0	B	7.5	35 58.6	46.7	A
9.3	20 27.9	22.0	R	9.5	3 42.5	41.7		8.4	17 29.1	13.7	A	9.2	25 53.4	6.4		9.5	36 39.2	1.4	
8.2	21 10.2	12.5	A	9.2	4 56.2	38.2	A	8.6	18 6.0	37.3	A	9.1	27 43.5	29.8		8.6	57.3	55.6	A
8.7	22 15.3	2.4	A	5.0	5 3.4	18.7	A	8.5	21 1.3	6.3	A	8.4	28 9.5	38.2	A	8.4	39 45.8	30.9	
7.8	47.2	24.8	A	9.0	17.0	31.8	A	7.8	17.1	18.9	A	8.5	59.4	48.5	A	8.5	41 9.3	47.1	R
9.5	24 35.0	2.1		9.1	7 6.6	22.9		9.3	30.8	35.1		9.2	33 42.0	30.4	A	9.0	45.4	6.5	
8.7	40.5	12.8	R	5.8	11 2.5	19.0	G	9.5	22 16.1	51.4		9.1	49.4	15.2		8.6	44 15.4	38.2	
8.6	25 46.8	51.7	A	9.5	10.0	2.9		9.0	24 34.5	10.6	A	9.5	34 2.5	35.3		9.5	45 0.3	26.0	
8.5	26 6.5	9.2	A	9.1	12 3.6	43.2		9.2	39.3	55.0		8.9	35 34.6	45.6	A	8.8	46 4.8	25.5	
8.7	16.6	17.4	A	9.4	13 45.9	3.2	B	5.0	25 50.4	49.9	A	9.5	36 52.2	57.4		8.9	47 21.8	13.1	B
9.4	34.7	26.2		9.2	59.1	9.7	A	6.5	28 7.1	11.1	G	9.4	38 51.0	6.8	B	8.7	34.2	36.4	A
9.4	27 54.5	19.1	B	9.4	15 12.9	27.4		9.3	10.3	23.9		8.5	45 1.0	35.3	A	9.0	48 58.6	47.6	A
9.5	28 9.1	25.6		9.5	20 3.0	53.5		9.4	19.6	33.6		9.5	46.5	54.5		8.7	49 18.8	53.5	A

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	12ᵘ—13ᵘ	+57°			13ᵘ—14ᵘ	+57°			14ᵘ—15ᵘ	+57°			15ᵘ—16ᵘ	+57°			16ᵘ	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	50 2.3	24.5		9.5	40 58.2	38.0		7.8	32 13.8	19.7	A	9.3	20 56.6	54.7		9.3	4 11.0	20.0	
9.1	29.7	54.8	A	9.5	41 52.3	27.1		9.3	33 21.2	52.6	B	8.9	21 5.0	22.5		9.1	28.5	10.5	
8.8	51 24.9	21.1	A	9.3	42 6.3	47.2	A	9.5	23.7	49.8		8.8	46.8	23.4		9.0	37.6	9.7	A
9.5	52 8.3	36.5		9.2	15.8	58.9	A	9.1	34 36.6	28.2		9.2	22 51.3	15.6		9.4	5 43.2	30.3	
9.2	9.4	52.2	A	9.4	44 5.8	24.3	B	9.3	35 37.0	13.6		9.3	23 5.8	55.0		9.5	43.3	21.5	
9.0	22.5	44.1	A	9.5	31.2	25.3		9.5	36 4.0	49.0		9.5	23.9	50.0		9.5	48.5	35.2	
9.4	24.2	25.8	B	8.9	46 19.5	31.5		9.4	16.8	33.7		8.8	46.0	8.3		8.0	6 1.5	14.1	A
5.0	54 32.0	7.9	A	9.3	47 6.7	0.1		9.4	37 5.4	45.1		9.3	24 51.9	3.9		9.5	11.0	3.8	
9.2	55 12.2	49.6	A	9.5	57.4	39.3		8.8	38 5.0	7.9		9.3	25 19.4	6.8		8.7	58.0	50.6	
7.2	28.8	44.1	A	9.5	48 1.0	32.0		9.5	40 42.4	38.7		6.9	31.6	56.3	B	9.0	7 48.5	37.2	
8.8	33.8	42.8	B	9.5	53 28.5	50.2		9.5	49.4	28.0		8.5	28 8.3	40.7	A	9.0	49.6	31.3	A
9.2	50.3	41.0	A	9.3	49.8	23.1		9.5	42 13.3	54.9		9.4	52.9	43.6		9.5	8 43.5	42.0	
8.8	56 29.0	11.7	A	8.1	54 19.7	11.5	B	6.3	13.3	13.2	A	9.5	30 36.9	43.6		9.5	46.1	50.0	
8.3	30.3	7.8	A	9.5	55 10.3	14.3		8.8	50.5	57.6		9.5	31 19.8	3.8		9.5	9 36.3	53.2	
9.1	58 1.0	1.5	B	9.3	36.1	57.6	A	9.5	44 41.0	2.5		9.5	32 2.0	44.6		9.5	49.0	17.5	
9.4	10.6	2.6		9.5	46.5	53.0		8.0	45 1.9	30.8	A	9.4	30.9	47.1	A	8.5	10 7.4	41.6	A
7.0	0 21.4	47.7	A	8.4	56 54.9	0.1	A	9.2	16.5	29.3	A	9.0	35 9.8	24.5		9.5	11 14.0	7.8	
9.5	3 28.0	59.4		7.6	57 7.3	55.5	A	9.4	24.2	53.6		7.9	26.6	59.3	A	9.0	24.7	50.9	A
6.8	36.8	36.3	P	9.4	8.0	55.9	B	9.5	48 28.9	14.6		9.1	33.0	54.6	B	9.3	40.0	40.6	
9.5	4 39.3	35.8	B	9.5	49.5	0.1		9.3	49 54.8	40.3		7.0	38.2	55.7	A	8.0	47.0	23.4	B
9.0	5 11.3	23.5	A	9.3	58 27.5	21.2		9.1	50 9.3	45.5	B	8.9	36 14.4	38.2	A	9.5	12 1.3	15.5	
9.5	6 2.1	9.1	B	9.4	40.6	17.3		8.8	51 32.4	35.3		9.0	58.3	44.2	A	8.2	13 51.2	39.1	A
9.5	7 8.8	50.1		8.7	47.5	8.0	A	9.3	52 42.9	44.6		9.5	40 13.0	45.6		9.2	59.7	3.2	
8.3	31.4	25.5	A	9.3	59 9.0	21.6		8.8	47.3	38.1		9.1	54.0	8.2		8.5	14 6.2	42.1	A
7.0	41.2	28.0	A	9.3	10.3	18.8		9.0	54 1.6	21.1		9.1	41 17.9	47.6		7.7	13.5	17.0	A
8.5	8 7.7	35.4	A	9.1	23.5	40.9	A	9.2	42.8	20.5		9.3	47.3	23.5		9.0	15 26.5	57.9	A
9.0	21.3	38.8		7.0	0 23.5	11.9	A	9.4	55.4	31.4		7.5	42 29.6	42.1	F	9.5	16 1.3	7.2	A
9.0	51.4	46.7	A	9.4	1 3.7	21.2		9.5	57 24.8	14.7		8.0	43 22.0	13.1	B	8.4	25.5	56.8	B
9.5	9 16.4	26.6	B	9.4	59.8	53.3		9.5	32.0	59.7		9.4	23.8	17.3	B	9.5	18 20.0	46.5	
9.5	10 8.4	24.0		8.5	2 31.3	24.1		9.5	58 11.9	56.7		9.3	44 14.2	3.8		9.0	20.0	39.1	A
9.5	9.2	5.4		9.5	4 4.2	39.9		9.5	1 11.4	48.1		9.0	45 59.3	34.7		7.5	42.4	12.6	A
8.1	19.6	51.4	A	8.5	5 36.4	27.6	A	8.8	39.9	40.7	A	9.5	46 26.5	49.5		9.5	51.6	8.8	
8.5	11 51.3	10.3		9.3	42.8	38.0		8.9	3 52.4	16.0		9.5	39.2	24.9		9.5	19 8.2	31.3	
9.0	15 5.8	43.6	A	9.5	6 22.5	0.1		7.3	5 37.8	39.7	A	9.3	47 25.1	30.6	B	9.5	21 26.0	17.5	
8.9	16 20.1	55.1	A	9.3	8 15.3	38.0		9.4	6 45.9	13.7		7.3	48 18.2	35.2	L	9.1	27.5	8.2	
9.5	17 7.2	54.9		9.0	11 0.5	20.7	A	9.2	8 39.7	35.3		9.5	49 40.0	34.9		9.5	22 12.3	47.0	
9.5	24.7	43.9		9.5	5.8	6.0		9.5	58.9	54.4		9.5	51.5	25.4		9.0	30.5	27.4	
8.0	20 10.9	43.5	B	6.5	17.3	21.7	A	9.0	9 21.1	35.7		9.4	50 9.1	52.7	A	9.3	24 56.7	46.5	B
9.4	21 4.9	4.1		6.5	27.4	21.6	A	8.3	58.3	45.1	A	9.5	52 17.0	10.6		9.0	25 41.0	3.7	A
9.3	34.7	36.1		9.3	12 44.2	3.0		9.5	10 7.4	32.3		8.5	55.0	43.0	A	9.5	26 16.2	32.0	
8.7	22 24.4	55.6	A	9.4	14 44.7	50.2		9.4	26.4	56.5		9.0	53 25.5	42.0	A	8.3	46.2	32.3	B
9.2	23 8.5	16.2	A	9.2	15 24.0	9.4		9.3	28.4	29.3		9.4	54 4.5	4.3	B	9.0	27 0.1	59.1	
9.5	24 8.8	50.3		8.9	32.5	19.2		9.1	40.7	53.4	A	9.5	10.6	32.7		8.5	28 29.3	44.0	
9.0	26 17.3	40.0		8.3	16 2.8	35.0	B	9.5	11 20.3	31.9		9.5	16.6	4.7		9.5	43.4	53.9	
9.0	26.7	33.5		7.8	10.3	50.9	B	9.5	55.9	26.0		9.5	24.5	53.8		8.5	29 35.7	48.6	A
8.5	27 15.3	13.9		8.5	17 49.4	32.5	A	8.8	13 15.7	54.7	A	9.5	55 14.0	26.9		9.0	40.0	43.0	
8.8	28 54.2	32.6	A	9.5	18 26.8	8.5		8.9	46.4	26.9	A	9.0	23.1	48.9	A	9.4	30 31.4	30.2	
9.2	29 32.3	6.1	A	9.5	19 23.3	11.4		9.3	14 12.3	31.9		9.0	56 37.0	49.6	A	9.5	31 48.3	54.1	
9.5	30 15.8	10.5		8.9	20 8.3	29.0	A	9.5	39.1	14.7		9.0	49.0	36.3		8.8	32 18.5	13.6	A
8.3	31 28.4	8.1	A	8.3	23 16.2	36.0		9.5	49.8	19.6		9.5	58 56.5	35.2		9.5	22.6	42.5	B
9.5	46.9	33.5	B	8.3	31.5	45.8		8.3	55.8	28.4	A	9.5	59 22.2	28.4		9.5	57.4	50.0	
9.5	32 2.3	37.0		8.5	24 46.8	47.8	F	9.4	16 32.4	24.6		9.3	29.1	23.3		9.0	33 22.0	38.7	A
9.5	4.3	51.2		8.7	25 37.1	17.0	B	9.5	36.4	58.0		8.5	0 6.7	49.0		9.5	42.6	39.1	
8.3	30.3	11.0	A	9.0	26 27.3	9.9		9.3	17 3.1	24.8	B	9.5	14.5	15.6		9.3	35 1.9	56.1	
9.4	34 25.4	57.9	B	9.1	55.8	18.3		9.5	6.4	15.4		9.5	28.0	31.8		9.4	36 38.0	57.8	
6.1	35 4.0	56.1	A	9.5	28 46.8	27.6		8.5	7.1	18.6	A	8.6	2 46.5	0.4	A	8.9	38 0.2	36.7	A
9.4	4.5	2.4	A	9.5	29 7.4	3.5		9.4	18 33.7	1.8	B	8.6	46.5	6.2	A	9.1	1.5	21.5	
9.0	36.7	18.2	A	9.4	40.3	9.0		8.0	37.1	26.9	A	9.5	3 2.6	16.1		8.2	39 20.6	27.4	A
8.5	53.7	27.6	A	6.3	52.2	42.3	F	9.5	40.5	56.0		8.1	33.0	58.7	L	8.8	47.0	50.5	
9.5	37 50.8	48.7		8.7	30 44.0	3.7	B	9.5	20 8.9	28.5		9.3	4 6.3	59.1		8.2	41 20.2	54.2	B

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	16ʰ—17ʰ	+57°			17ʰ	+57°			17ʰ—18ʰ	+57°			18ʰ—19ʰ	+57°			19ʰ	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	41 43.0	57.4		9.4	23 11.6	0.7		9.5	53 22.5	48.8		8.6	31 32.2	44.0	A	9.2	0 51.4	10.6	A
5.0	42 34.4	3.0	A	8.8	22.1	56.1		9.5	46.6	58.9		7.5	32 4.2	40.8	A	7.8	1 6.6	14.5	A
9.4	47.7	43.0	B	9.5	48.2	32.7		9.4	58.1	32.8		8.9	10.5	48.8	A	9.4	2 56.8	24.8	
9.1	50.3	59.1		8.8	24 31.5	14.4		9.5	55 43.1	13.6		9.0	31.6	4.0	A	8.5	3 38.6	18.0	A
9.5	59.0	39.1		8.9	31.9	24.8		9.5	45.7	16.0		8.4	33 26.3	30.6	A	9.5	4 7.2	53.6	
9.5	43 15.1	59.0		8.4	39.8	56.7	A	9.5	56 3.2	44.0		9.2	53.6	21.8	A	9.1	12.9	16.0	A
9.5	17.9	54.6		8.2	25 18.9	37.8	A	9.5	9.6	1.9		9.5	34 5.5	4.0		7.4	52.4	50.7	R
8.0	45 0.5	9.1		9.5	26 4.5	5.0		9.5	11.1	56.6		9.3	19.3	45.0		9.0	5 15.3	6.3	A
7.2	25.0	44.6	B	7.8	5.1	13.8	A	9.5	57 17.5	4.5		9.5	35 18.6	53.4		7.8	31.7	54.6	F
9.5	46 2.5	28.3		9.5	12.6	2.2		9.4	31.3	42.0	B	8.2	37.0	6.5	A	9.2	32.2	31.9	R
9.5	47 36.0	8.8		8.8	27 23.9	35.8		9.0	58 0.6	25.5		9.0	36 17.6	33.9	A	9.5	59.4	6.5	
9.3	49 43.7	51.6	A	9.5	44.2	49.3		8.0	2.7	21.2	B	9.5	55.3	20.7		9.3	6 0.6	16.1	A
9.5	51 5.2	20.5		9.5	28 8.8	22.4		9.4	59 7.1	56.7		9.3	38 5.4	21.2		9.0	2.8	15.1	B
9.3	35.4	20.5		6.7	25.1	59.2	A	9.2	0 8.2	28.7		9.0	53.2	55.1		9.5	7.5	24.6	
9.2	52 58.3	27.2	B	7.8	29 22.2	1.4	B	9.0	35.7	5.7		7.7	40 21.8	42.1	A	8.8	7 28.2	42.4	A
8.8	53 59.2	24.8	A	8.8	31.2	16.7		9.3	1 43.1	45.0		7.7	56.8	40.6	A	9.3	32.2	19.8	R
9.3	59.6	26.4	B	9.4	39.4	45.8		7.4	3 36.5	20.4	B	9.0	41 20.9	26.3	B	9.1	8 16.0	16.5	R
8.6	54 23.2	22.4	A	8.6	43.2	33.3	A	9.0	4 32.6	44.6	A	8.5	26.8	47.6	A	8.8	20.2	31.9	R
8.9	56.3	10.1	A	9.0	30 57.8	46.9	A	9.4	52.7	55.4	A	8.8	38.3	3.5		8.7	9 7.2	47.4	A
9.5	55 18.0	20.1		6.3	31 10.5	39.5	A	7.1	6 23.8	57.3	A	8.0	42 0.6	7.8	B	9.2	33.0	32.0	
9.3	24.6	16.1	B	9.2	32 18.8	8.1	A	9.5	48.3	53.1		8.9	7.4	48.3	A	7.2	33.9	24.5	F
9.2	33.2	32.8		9.5	46.4	28.2		9.5	57.3	58.9		9.0	43 23.3	28.3		9.5	10 7.3	9.1	
9.4	40.3	39.6	B	9.4	33 20.1	7.6		9.4	7 29.7	42.2	A	9.4	44 41.0	45.0		9.3	24.8	39.0	
9.5	56 15.0	9.1		9.5	41.5	32.8		9.2	33.1	45.4	A	9.2	45 11.4	23.4	B	8.2	27.4	51.3	A
9.5	57 3.4	2.5		9.2	34 9.6	1.4	A	9.2	8 23.1	27.9	A	8.0	31.7	21.7	A	9.2	32.6	6.8	
8.2	58 32.3	19.6	A	9.3	39.0	49.9		9.2	28.4	13.2	A	9.5	47 1.7	39.0	A	9.4	11 17.4	48.0	
8.8	44.6	12.2	A	9.2	49.6	27.4		9.5	54.9	56.5		8.1	2.6	40.2	B	8.8	20.6	55.5	A
9.5	59 20.6	34.8		8.1	37 39.9	28.6	A	9.5	9 16.7	29.4		9.3	30.5	46.3	A	5.3	21.2	27.1	A
8.2	1 4.8	42.1		9.2	52.5	52.0	A	9.3	25.4	23.6		9.3	47.5	1.1	B	8.5	21.9	4.6	A
8.6	57.2	2.9		7.9	38 13.1	55.9	A	9.4	56.8	21.2		9.2	48.6	43.6	A	8.9	49.5	7.0	B
9.5	2 3.1	28.2		7.0	14.0	23.3	A	9.0	10 50.7	46.9	A	8.5	48 22.6	4.0	A	9.2	12 18.4	8.0	A
9.3	9.4	30.6		9.5	16.3	0.3		9.5	11 44.3	41.4		8.8	42.3	56.2		9.5	13 18.7	39.0	
8.8	23.9	8.3		8.5	26.4	30.5	A	9.3	12 3.2	8.7	A	9.5	50 3.1	4.1	A	9.5	28.5	2.2	
9.5	39.8	19.9		9.5	39 34.1	0.5		9.2	20.4	26.6		9.3	16.6	15.9	A	9.5	14 52.4	21.5	
9.5	4 30.1	22.5		9.5	40 23.5	7.9		7.6	32.4	57.2	L	6.3	51 17.3	16.9	A	9.5	54.2	8.6	
9.3	57.0	38.6		9.5	58.3	8.8		8.0	57.3	17.3	B	9.3	54.8	46.5		9.4	15 7.0	22.6	
9.5	5 2.3	37.8		9.0	41 53.9	50.1	R	7.5	15 38.9	49.8	A	9.3	52 0.9	37.2		8.7	14.5	40.5	
9.2	9.2	45.8		8.6	42 1.0	10.2		9.1	16 9.5	28.0	A	9.5	44.0	38.6		9.0	17.3	42.1	R
9.4	6 9.7	47.4		9.5	43 43.9	9.1		7.6	17.5	57.0	A	9.4	57.6	39.7		9.5	28.3	28.2	
9.5	7 1.6	10.8		8.2	58.8	38.2	R	9.5	40.0	13.0		8.6	53 23.8	26.8		9.5	31.0	28.0	
9.0	19.4	3.8		9.3	44 4.9	39.1	B	9.4	43.1	9.5		8.7	54 13.2	30.5	B	9.0	16 15.1	36.0	
8.0	9 53.1	23.5		9.5	7.4	1.1		9.0	17 20.7	19.1	A	5.8	20.0	37.6	G	9.2	46.7	3.5	
9.3	11 51.1	12.4		9.2	30.3	31.0		9.5	41.2	39.0		9.2	20.3	11.9		8.5	53.2	13.6	A
9.1	59.4	54.4	A	9.4	34.9	3.8		8.6	18 6.1	10.9	A	9.2	21.3	8.0		9.5	56.0	17.5	
9.1	12 8.3	55.3	A	9.4	45 28.5	4.0		9.4	19 3.9	15.9	A	9.2	55 7.2	19.2	A	9.3	17 25.3	9.1	
9.0	42.0	42.1	A	8.7	31.4	9.9		9.2	23.0	36.1	A	9.3	56 19.4	35.3		6.0	38.2	22.1	A
9.2	14 3.6	52.9	A	9.5	41.6	24.5		9.3	20 11.2	24.2	A	9.4	38.5	53.6		8.5	49.9	40.0	
9.4	59.8	33.4	A	9.4	50.4	35.1		8.1	21 9.4	12.9	A	8.5	58 2.3	17.1	A	9.0	18 1.5	48.6	
9.5	15 1.1	21.7		9.2	46 38.2	51.0		9.5	22 15.6	45.0		8.1	17.4	36.4	A	9.3	5.7	54.6	B
9.5	33.5	55.3		9.4	44.0	28.6		9.5	38.6	32.2		9.0	37.0	17.0	A	9.3	17.4	53.6	
9.2	16 44.0	20.4		9.4	47 1.1	53.4		9.5	23 7.0	23.2		9.3	47.0	55.8		9.2	28.5	58.6	R
9.2	50.3	25.4		9.0	42.2	13.0		9.5	25 25.3	43.2		8.7	47.7	48.4	F	9.3	[illegible]	[illegible]	A
9.3	51.2	44.3		7.7	48 10.3	29.0	A	7.5	34.6	18.2	B	9.3	57.3	50.7		7.5			A
9.5	55.2	3.1		8.7	49 0.5	41.8	A	7.7	45.2	50.2	A	9.5	59 3.7	28.5		[illegible]			
9.5	17 39.0	34.5		9.5	35.2	16.1		9.5	26 26.9	47.3		8.9	5.3	37.3	A	[illegible]			
9.5	19 36.6	57.4		9.3	50 29.7	56.4		9.5	27 5.6	54.3		9.2	6.3	36.5	B	[illegible]			
9.5	20 2.8	0.2		9.5	31.5	38.9		8.9	42.4	9.0	A	9.4	28.4	29.5					
6.3	52.9	8.5	A	9.5	34.1	14.8		8.8	29 46.8	37.7	A	9.5	0 43.0	56.3					
9.5	21 19.0	40.4		9.4	51 18.1	4.9	B	9.5	31 0.0	29.2		9.3	43.5	5.7					
8.0	55.4	55.3	B	9.4	52 42.7	47.1		9.3	24.6	41.8		8.7	50.9	20.4					

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	19h	+57°			19h	+57°			19h—20h	+57°			20h	+57°			20h—21h	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	23 11.1	1.0		7.8	42 48.9	32.1	B	9.5	59 45.1	21.7		9.4	17 12.2	19.6		9.5	41 47.8	2.6	A
9.0	31.2	13.0		9.1	56.5	47.0		9.4	55.0	6.7		9.4	52.0	7.2		9.5	42 40.7	12.2	
9.4	24 39.2	38.5		9.1	43 12.7	1.5		9.4	0 17.0	46.6		9.5	18 19.5	4.1		6.7	43 28.7	53.0	A
8.8	25 3.6	55.3	R	9.1	49.2	28.1		8.9	23.3	23.9	B	9.5	26.1	41.0		9.5	34.0	43.5	
9.1	17.1	10.2		8.8	44 7.1	23.7		9.3	26.7	45.4	A	8.4	19 48.0	3.8	R	9.5	54.8	45.0	
8.5	21.3	17.0	A	9.0	20.2	7.7		9.0	34.2	8.5	A	9.3	20 10.6	26.6		9.5	44 4.0	31.8	B
9.5	37.5	34.0		9.0	35.0	5.8		9.4	39.7	52.5	A	9.2	56.1	38.5		9.5	10.7	29.5	
9.0	41.2	45.5		9.5	45 3.4	23.1	B	9.0	1 17.7	36.0		9.4	21 2.2	21.1	B	8.0	45.1	42.0	A
9.0	46.0	19.1	A	9.3	13.1	11.2		7.5	35.5	12.0	A	9.0	6.1	37.0		9.2	46 52.5	4.5	
8.3	26 3.7	58.0		8.9	42.6	5.1		9.3	2 3.6	31.6	A	9.5	12.5	51.3		9.4	48 0.4	26.7	
9.5	15.0	28.5		9.5	56.3	19.5		9.2	20.8	41.5		8.0	15.1	54.6	B	9.5	3.8	2.5	
9.5	16.7	14.2		9.2	58.1	33.1	A	9.2	21.7	42.5	B	9.5	21.9	16.3		9.5	9.1	35.5	
8.5	27 1.8	39.6		9.5	46 5.0	15.0		8.9	22.1	58.4	A	9.4	22 13.6	10.7		9.2	15.4	49.4	A
9.5	50.2	46.1		8.2	15.2	2.8	B	var	27.6	34.1	A	9.5	15.1	50.7		9.5	44.6	51.5	
9.0	56.3	31.0		9.5	47 51.6	9.7		8.9	28.6	35.1	A	9.3	19.0	54.7	B	9.3	49 36.8	0.8	
9.5	28 12.4	12.5		8.0	54.1	23.6	A	9.5	38.0	3.9		9.2	24.2	22.1		8.9	38.6	29.0	
9.0	21.8	34.7	B	9.2	48 15.6	37.0	A	9.0	43.8	30.3	A	9.5	40.0	54.6		9.5	40.7	4.6	
9.4	22.1	25.0		8.9	49 13.1	35.5	A	9.5	3 7.5	39.2		9.3	42.7	55.3	B	9.5	50 3.8	50.3	
9.3	52.2	35.3		9.3	29.7	41.4	R	9.5	19.8	29.0		9.4	47.3	56.0		9.3	16.1	25.6	
9.5	29 41.9	40.0		9.4	30.8	52.0		9.5	4 2.5	31.3	B	9.5	24 59.8	53.0		9.5	18.6	32.0	
8.8	47.8	52.7		8.5	48.7	18.7	A	9.5	3.9	14.5		9.5	25 11.4	26.6		9.0	27.4	17.1	
9.5	30 30.2	40.1		9.3	50 4.7	9.5	A	9.3	17.7	42.2	A	9.1	30.1	34.0		7.3	51.3	7.1	A
9.0	49.8	10.3	R	9.5	7.4	38.4		9.5	30.0	11.6		9.4	32.1	17.6		9.4	51 2.5	3.5	
9.4	31 18.2	52.0		5.4	19.0	8.5	A	7.2	41.1	22.9	A	8.0	41.8	38.0	F	8.3	52 14.1	31.6	A
8.8	33.4	8.1	R	7.5	20.7	47.5	G	9.5	45.6	1.0		9.5	26 48.1	10.7		9.4	21.6	32.1	
9.0	34.2	44.5	A	9.3	25.1	52.8		9.2	5 4.5	9.1	A	9.5	27 14.6	50.8		9.3	53 10.3	15.6	
9.4	41.6	34.9		9.3	59.9	9.8	A	9.5	42.8	45.4		7.3	16.2	47.4	F	9.3	25.1	17.6	
9.3	51.2	33.7		9.5	51 13.6	20.5		9.1	56.0	8.5	A	9.5	30.9	54.9		8.0	45.0	25.6	A
8.0	32 9.3	27.2	F	9.5	14.7	45.0		8.1	6 1.8	53.6	B	9.0	48.1	0.2		8.5	54 34.6	36.0	A
9.5	35.4	36.0		9.4	28.9	4.0	A	9.4	24.9	0.1		9.1	28 42.7	22.1		9.5	56 12.7	4.5	B
8.8	46.5	54.4		8.5	52 11.5	33.3	A	7.8	40.6	6.2	A	8.0	52.6	14.1		9.5	34.1	22.1	
9.1	48.0	47.1		6.3	29.4	52.0	A	9.5	52.4	28.1		9.1	59.1	42.0		9.5	42.3	13.6	
9.2	57.1	16.9	B	8.3	57.0	38.9	A	9.5	7 43.5	22.1	B	9.4	29 35.8	0.3		7.0	58 4.6	11.6	A
9.3	33 30.0	45.8		9.1	53 38.1	48.0	A	9.5	8 7.6	37.2		9.0	37.1	23.1		8.9	41.6	40.6	A
9.5	35.6	48.1		9.4	54 4.8	50.0	A	9.5	35.7	37.3		9.1	49.2	50.5		8.5	58.1	22.1	A
9.2	46.0	52.1		9.4	6.7	13.2		9.5	42.0	18.1		8.5	30 18.1	17.6	A	9.0	59 6.1	40.5	A
9.5	52.0	46.1		9.5	43.1	25.6		9.5	47.8	15.4		9.2	58.7	49.4		9.0	59.2	19.6	A
8.8	34 4.8	2.4		9.5	55 17.5	53.5		8.9	9 42.2	1.6	A	9.1	31 2.6	12.6	A	9.5	0 9.9	51.6	
9.4	38.1	7.9	B	9.5	23.0	29.6		9.3	10 11.6	36.4		7.8	6.7	25.6	A	9.0	13.1	39.5	A
9.4	35 0.9	59.6		8.7	23.0	43.6	A	9.4	41.8	17.1		9.4	18.6	31.1		9.4	30.6	7.6	
9.5	9.4	14.7		9.4	28.2	12.1		9.3	11 0.0	39.5		9.2	25.0	13.1	A	8.0	53.4	55.5	A
9.5	36 2.1	25.2		9.2	31.8	2.4		8.0	12 2.1	53.4	A	9.4	40.1	38.5		9.5	2 18.0	54.4	
9.5	13.2	47.0		9.4	37.2	34.8	B	9.3	7.2	39.0		8.3	32 9.6	37.0	A	9.4	45.4	53.1	
9.1	31.1	44.1		9.3	53.5	7.1		9.3	22.1	31.1		9.5	24.1	40.5		9.4	54.9	25.2	B
8.7	33.7	2.1	A	8.9	56 0.1	33.4	A	9.2	52.6	23.6		9.5	27.2	10.7		9.0	3 34.6	48.5	
9.1	42.8	28.2		7.5	3.2	24.9	A	8.8	56.2	36.0		9.5	47.4	57.5		8.8	35.1	39.5	
9.5	37 10.0	9.7		9.5	19.6	10.2		9.2	59.6	37.5		9.5	34 10.0	49.8		9.4	5 22.1	42.0	
9.3	10.4	56.7		9.2	40.7	6.6		9.1	13 2.7	18.1		8.3	14.1	13.6	A	9.5	32.3	16.6	
9.2	40.1	22.7		9.0	57 14.8	24.7	A	9.2	22.0	11.0		9.0	46.9	52.6		9.0	44.1	1.9	B
9.5	54.8	13.6		8.5	16.7	7.6	A	9.3	46.2	20.6		8.4	35 39.1	24.1	A	8.5	59.0	10.1	A
9.0	38 17.2	13.2	A	8.9	30.4	2.8	A	9.4	49.6	43.0		9.4	36 25.4	40.8		8.7	6 11.4	57.5	A
8.9	24.3	49.5		9.5	55.5	37.8		9.3	14 12.1	21.6		9.3	28.3	30.9		9.5	20.0	54.7	
9.5	41.9	20.7		8.9	58 27.1	45.8	A	9.4	29.7	30.5		9.2	51.7	35.5		8.9	57.1	31.5	A
9.3	39 11.5	59.8		8.8	42.0	41.6	A	8.4	15 7.1	19.6	A	9.3	37 45.1	24.6		9.5	7 19.6	18.1	
9.3	42.9	5.4		7.7	43.7	14.7	A	9.2	31.3	54.9		7.7	38 46.0	14.3	B	8.0	24.0	2.0	A
9.2	40 17.3	49.1		9.2	45.4	45.9	A	9.3	16 7.5	5.3		9.5	39 15.2	50.6		7.3	49.4	51.6	A
6.2	27.0	40.1	A	9.3	56.0	16.0		9.5	34.4	38.4		8.3	17.0	0.9	A	8.9	56.1	41.0	A
9.5	53.3	49.5		8.6	59 14.5	6.5	A	9.5	42.4	39.2	B	9.3	34.6	49.5		9.3	8 22.7	12.6	
9.5	41 23.7	57.0		9.2	40.2	0.6	R	9.5	50.8	18.1		9.4	40 27.0	49.7		9.1	31.6	15.6	
9.5	42 23.3	14.2		9.3	41.7	47.8	A	8.5	52.1	24.1	A	4.5	41 46.8	3.6	A	8.3	9 6.1	26.6	

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	21u	+57°			21u	+57°			21u—22u	+57°			22u	+57°			22u	+57°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	9 14.3	49.0	R	9.5	35 19.7	25.1		9.5	49 36.5	52.0		9.1	7 40.5	39.5		9.0	23 2.2	22.1	
9.1	25.1	52.5	R	9.5	34.1	17.5		8.3	46.3	59.6	A	9.4	56.5	50.8		8.3	4.1	40.9	B
6.5	10 6.1	42.5	A	9.2	40.8	21.6		9.5	50 0.8	24.3		9.5	59.3	36.4		7.9	12.6	48.0	A
9.3	22.1	39.5	A	9.5	41.0	4.2		9.0	19.3	22.8		9.5	8 33.4	18.0		9.5	15.2	8.2	
9.4	11 55.9	21.6		9.5	43.7	37.8		9.4	25.6	13.0	A	8.8	41.9	31.0		9.0	35.7	17.7	
9.5	12 2.3	7.9		9.3	36 5.8	32.7		9.2	32.3	14.5	A	9.5	45.8	13.0		8.5	43.0	9.3	
9.0	7.6	42.5	A	9.3	9.3	26.9		9.5	40.0	4.5		9.1	55.0	17.8		7.5	47.1	39.4	A
9.4	26.3	31.6		9.3	40.1	36.0		9.4	51 32.1	14.4		9.5	9 24.7	11.1		var	49.1	40.9	A
6.5	13 21.1	58.9	A	9.5	42.8	6.8		9.3	35.2	10.6		8.6	10 7.6	33.3		9.0	24 54.9	16.4	
9.1	23.6	33.0		9.5	37 7.4	33.7		7.8	36.5	43.1	A	9.5	32.9	9.8	B	9.5	25 13.5	50.2	
9.2	14 39.2	59.6		8.8	22.4	11.8	A	8.2	52.9	56.0	A	9.2	46.5	44.9		9.3	42.4	12.3	
6.8	15 21.5	42.4	A	8.7	32.9	50.2		8.5	52 21.3	42.2	A	9.0	59.1	42.1		9.5	26 33.8	15.7	
9.5	44.6	59.0		9.5	47.6	19.3		9.5	48.5	35.8		8.2	11 7.8	15.3	A	9.5	53.2	18.5	
9.5	58.0	42.8		7.2	53.0	4.7	A	8.7	53 12.9	26.0		9.1	15.9	54.7		9.4	27 2.1	9.6	
9.5	16 14.7	12.8	R	9.3	55.0	11.0		9.3	43.5	7.9		9.2	25.6	52.5		9.5	3.2	7.1	
8.9	17 54.2	3.5		9.4	38 4.9	34.8		9.0	52.0	23.3		9.0	26.7	35.9		9.5	20.5	27.6	
8.5	18 52.4	4.0		9.3	45.2	57.7		9.5	54.4	42.5		9.5	32.6	47.8		9.1	32.6	20.7	
7.5	19 41.7	19.0	A	9.5	57.0	54.5		8.7	55 16.6	28.1		9.2	40.6	18.9	A	8.7	37.9	44.1	A
8.8	59.6	10.3		9.5	59.7	44.2	B	9.5	54.2	50.4		9.1	47.0	27.9	A	9.5	28 27.7	15.5	
8.7	20 4.3	30.8		8.6	39 10.9	34.1	A	9.5	56 25.8	15.6		9.4	12 13.5	53.1		9.5	47.9	17.9	
8.9	26.6	51.2		9.4	13.8	14.6		6.4	57 12.0	18.0	A	9.0	17.9	21.7	A	9.3	50.5	28.0	
7.1	50.8	27.2	A	9.4	20.7	18.3		8.1	13.9	21.2	A	8.9	13 4.2	28.5	A	7.5	29 3.1	25.4	A
8.6	21 3.5	32.0	A	9.3	21.4	10.0		9.0	36.6	6.5		9.5	20.6	53.6	B	9.1	32.3	56.5	
9.5	12.0	28.9		9.4	22.2	28.3	B	9.5	55.0	31.4		9.5	22.0	48.4		9.1	30 1.4	21.3	A
9.4	22.1	39.7	B	9.5	22.2	31.8		9.5	58 26.9	21.6		9.0	14 40.9	11.2		9.5	11.7	31.1	B
7.7	25.5	36.6	A	8.9	47.9	4.6	A	9.1	59 7.6	18.0		9.5	15 4.1	15.6		9.2	48.6	14.5	A
9.5	22 14.9	17.0		9.1	54.8	53.1		9.5	20.5	18.2		9.1	12.2	21.5		9.5	49.9	7.8	
9.4	23 11.9	57.8		9.0	54.8	30.3	B	9.5	51.6	0.9		7.2	27.0	40.8	A	7.3	56.4	40.7	A
9.4	37.6	58.2		9.5	40 5.7	59.5		9.5	0 2.5	26.4		9.5	48.1	2.6		8.8	59.6	51.2	A
8.8	38.8	44.5	A	9.4	5.8	24.0		7.9	23.8	31.9	B	9.5	16 20.4	38.0		9.5	31 25.4	49.4	
9.5	55.0	45.7		9.1	6.2	28.8	A	8.8	41.6	14.3		9.3	41.0	9.6		8.1	32 8.8	53.4	A
9.1	24 1.1	25.5		7.7	8.1	33.3	A	8.5	46.0	36.2		8.9	47.3	8.9		9.5	24.4	13.7	
9.5	25 14.0	22.4		9.2	50.3	55.3		9.0	49.4	1.9		9.3	51.0	59.6		9.5	24.4	26.2	
9.0	36.1	10.6		9.5	41 1.0	47.7		9.5	1 9.6	44.6		9.5	17 12.3	13.6		8.4	31.3	53.7	A
9.4	46.0	8.8		8.9	35.6	7.5		9.4	47.1	2.1		8.3	13.6	52.4	A	9.5	41.5	14.5	
9.5	49.7	4.7		7.5	43.0	23.8	A	9.2	2 6.8	8.6		9.0	13.8	21.0		8.8	33 10.7	32.4	A
9.2	55.3	36.8	A	9.5	42 44.5	12.6		9.3	11.9	24.8		9.5	19.2	35.7		9.4	16.6	52.9	
8.6	26 11.0	40.5	A	9.4	50.1	6.3		9.1	35.4	55.3		9.2	20.2	34.6	B	9.5	32.9	55.6	
9.3	15.3	23.7		8.5	59.9	36.3	A	9.4	49.2	36.0		9.5	18 31.7	8.7		9.2	34 14.2	47.6	B
9.3	32.6	7.9	A	9.5	43 32.5	22.0		9.2	3 2.4	16.8		7.6	34.4	48.3	A	9.5	15.2	48.6	
9.5	58.6	58.2		9.3	43.0	42.9		9.1	27.9	30.5		8.5	44.6	2.2	A	9.5	28.1	40.2	
8.7	27 2.3	37.2	A	8.5	48.0	10.0	A	8.8	38.5	17.3	A	9.5	19 3.5	55.4		9.2	48.4	17.9	
9.0	6.4	15.6	A	8.2	48.5	17.4	A	9.1	4 7.6	18.6	A	9.4	27.1	6.2	B	9.4	35 14.8	13.6	
8.1	45.9	58.0	A	9.5	44 34.1	57.8		8.6	20.4	20.9	A	9.4	35.8	6.3	B	9.3	32.1	0.9	
9.5	53.5	5.4		9.5	40.1	29.5		9.5	21.6	8.7		9.5	42.8	6.3	B	9.5	36 7.6	2.0	
9.5	28 10.2	39.5		9.0	49.6	49.8		9.5	27.6	8.7		9.5	20 15.2	58.8		9.0	27.3	47.3	A
9.4	29 6.0	2.0		9.5	45 12.7	40.4		9.3	35.0	30.6		9.5	23.8	9.6		7.8	48.6	46.3	A
9.5	12.6	56.6		9.5	13.0	33.6		9.1	35.1	33.9	B	9.5	27.8	5.9		8.0	37 15.5	40.3	A
8.2	22.4	33.2	A	8.7	46 12.1	57.4	A	9.5	40.6	36.1		9.5	28.1	3.6		9.5	38 4.6	2.0	
9.5	54.6	4.5		8.4	47 5.5	51.3	A	8.9	44.2	42.6		9.3	31.5	43.0		9.4	27.9	40.1	
9.0	30 0.0	24.8	A	9.3	15.9	16.2		8.4	5 6.6	6.5	A	9.4	35.6	29.6		9.5		31.0	
9.5	34.5	35.2		9.0	37.3	26.4		9.4	20.0	25.8	A	8.8	49.7	15.8	A			3	A
9.5	39.9	5.5		9.4	43.5	57.9		9.5	34.2	34.2		9.5	21 38.7	19.3					
8.5	32 36.8	29.1	A	8.2	45.9	39.5	A	9.1	44.3	46.8		9.5	47.7	4.9					
9.5	33 59.4	1.9		9.5	48 13.0	47.6		4.1	49.6	29.3	A	9.1	51.2	5.5					
9.2	34 3.0	7.4		8.7	23.9	40.2	A	8.0	52.8	13.4	A	9.3	22 3.5	37.9					
9.5	18.4	15.5		9.0	24.4	34.0		9.3	6 0.2	50.9		9.5	31.0	40.6					
9.3	44.0	8.8		8.7	53.9	6.3	A	8.4	39.6	0.0	A	9.5	39.1	32.[illegible]					
8.2	54.6	13.4	A	9.3	49 0.0	29.2		9.5	41.8	2.7		9.5	43.4	9.[illegible]					
8.7	35 18.6	35.6	A	9.5	8.9	44.9		9.0	50.9	45.0		9.2	58.0	4[illegible]					

2601—2654			
	22h	+57°	
m	′ ″	′	
8.0	40 20.1	18.7	B
8.9	23.6	18.5	B
9.5	27.3	4.1	
9.4	33.7	25.6	
8.6	43.3	57.4	A
9.1	55.9	32.1	A
8.5	41 7.9	19.1	
9.0	8.0	58.8	A
9.5	11.1	4.3	
9.4	29.0	0.6	
9.5	34.1	43.6	A
6.3	39.3	43.3	A
9.2	45.0	47.4	A
9.2	58.0	1.3	
9.5	42 1.8	22.8	
9.2	18.8	6.5	
9.5	22.5	16.6	
9.5	43 25.1	55.0	
9.5	28.8	58.9	
9.5	33.7	47.5	
9.5	48.6	27.9	
9.5	53.7	17.8	
9.5	44 1.0	58.0	
9.4	24.5	23.0	
9.4	30.2	53.6	
8.9	35.8	57.5	R
9.5	37.7	16.1	
9.5	57.7	11.8	
8.6	45 56.3	25.7	
9.5	46 18.2	38.6	
9.5	18.4	34.1	
9.3	18.4	55.8	
9.0	29.2	51.4	
9.5	42.5	6.2	
8.8	47 29.6	10.8	
9.2	48 3.0	29.6	
9.5	50.4	33.5	
9.3	51.5	52.6	
8.9	57.3	35.6	
8.7	49 8.2	26.6	G
8.8	26.2	50.8	
9.2	44.6	9.9	
9.5	49.0	51.8	
7.0	50 6.7	25.7	A
9.5	9.5	16.9	
9.4	13.3	5.4	
9.4	18.7	15.4	
9.3	23.6	12.5	B
9.4	51.6	33.1	
9.4	57.2	34.0	
9.5	59.0	23.2	
9.5	51 35.6	26.4	
9.4	52 10.1	41.5	B
9.5	16.9	25.8	

2655—2708			
	22h—23h	+57°	
m	′ ″	′	
9.4	52 18.7	44.3	
9.2	21.4	32.8	
9.5	23.6	2.5	
9.5	23.8	35.2	
9.5	40.5	12.0	
8.1	59.2	47.7	A
9.0	53 0.0	0.2	A
9.3	43.6	55.6	
7.0	58.1	0.1	A
9.0	54 16.5	42.5	A
9.5	17.8	33.2	
9.4	55 0.4	40.5	
9.5	14.0	23.7	
8.0	23.8	29.2	A
9.4	29.0	13.5	
9.3	36.6	19.3	
9.4	45.0	37.6	
8.9	56 2.3	29.5	A
8.5	10.6	29.4	
8.4	19.1	27.7	A
9.3	47.2	22.0	
6.5	57 16.1	47.2	A
9.3	26.2	13.1	
9.4	29.7	31.8	
9.4	35.9	52.5	
9.3	40.7	7.7	
9.1	49.5	26.5	A
9.4	58 7.6	55.5	B
9.4	12.5	44.4	
8.6	39.9	57.2	A
9.5	46.5	0.7	
8.5	54.1	40.8	A
8.8	59.2	53.1	A
7.2	59 0.3	57.2	A
8.1	3.4	27.7	A
9.5	24.1	37.2	
9.5	27.4	43.6	A
9.4	0 41.8	0.7	
8.3	1 17.5	38.0	
9.2	25.0	49.8	A
9.1	31.2	55.8	A
9.2	32.5	11.6	
9.5	49.3	56.1	
9.5	57.4	30.0	
9.4	2 39.2	0.8	
9.5	3 46.9	21.4	
9.4	52.8	55.4	A
9.5	4 5.5	27.0	
9.5	20.0	40.0	
9.5	21.7	35.0	
8.8	37.4	19.7	
9.5	5 4.7	8.7	
9.4	26.6	56.1	A
9.5	58.1	29.0	

2709—2762			
	23h	+57°	
m	′ ″	′	
9.2	6 3.3	59.1	A
9.5	13.5	37.0	
9.5	7 14.9	46.0	
8.0	33.5	3.0	B
8.0	46.0	9.9	B
8.5	9 20.9	15.6	A
8.5	53.6	4.7	A
9.4	10 3.3	31.9	B
9.5	4.9	53.0	
9.0	11 42.8	53.1	
8.0	12 0.8	23.1	A
9.0	13 8.9	33.8	B
8.9	13.3	59.7	
9.5	43.7	43.4	B
8.2	52.9	43.4	B
8.7	14 6.9	28.0	A
9.5	7.7	15.1	
9.2	15.1	5.4	A
9.2	58.2	7.8	
9.0	15 0.9	35.5	A
9.1	5.5	25.1	A
9.2	34.3	25.4	B
9.4	36.3	22.4	
9.5	16 21.4	13.1	
9.2	40.8	21.1	A
9.2	51.5	20.1	A
9.5	17 56.6	4.8	
9.1	18 32.9	37.0	A
9.4	19 52.9	14.0	B
9.3	56.3	53.2	
8.6	20 2.0	58.5	R
9.5	49.6	17.1	
9.5	58.0	36.0	
9.5	21 0.0	22.6	
9.4	35.1	3.5	
9.4	22 17.0	8.6	
9.4	40.2	37.5	
9.5	23 5.5	41.1	
7.2	12.8	45.5	G
5.7	23.4	45.8	G
9.0	37.5	59.0	
9.5	38.7	11.3	
9.4	44.7	3.5	
8.2	24 10.3	36.1	G
9.5	33.6	31.3	
9.5	43.5	27.8	
9.3	53.5	48.1	
9.0	25 7.8	57.6	
9.5	21.4	0.9	
8.0	26 2.0	6.3	B
8.4	4.0	16.7	A
9.5	28 12.1	46.2	
9.0	40.2	13.9	
9.5	29 2.5	35.2	

2763—2816			
	23h	+57°	
m	′ ″	′	
9.1	29 21.0	58.9	A
9.5	24.0	20.3	
8.6	30 13.3	10.5	A
8.3	31 1.0	17.8	A
9.0	2.5	24.3	A
9.3	4.4	5.6	
8.8	10.2	35.4	A
7.2	32.0	51.4	G
9.5	32 15.0	12.4	
7.5	21.2	56.8	G
8.7	23.7	24.8	A
9.4	41.0	31.8	
9.1	58.2	2.0	A
9.3	33 7.4	53.3	
9.5	27.4	23.3	
9.5	37.0	32.3	
9.5	34 1.1	57.0	
7.1	5.4	2.2	A
9.5	37.9	20.3	
9.5	35 27.6	53.8	
9.0	34.7	48.3	
9.5	36 16.6	14.4	
9.0	18.0	11.4	A
9.2	19.7	13.1	B
7.5	23.8	15.3	A
9.5	30.0	14.4	
9.3	34.8	30.8	
8.9	35.5	39.7	B
9.5	37.6	14.4	
8.1	37 0.2	56.5	B
8.0	23.0	57.7	B
8.6	37.0	44.7	
8.7	38 3.5	28.2	A
8.9	13.9	3.8	A
9.1	52.1	48.4	B
9.1	56.7	43.1	
9.4	57.7	52.7	
9.4	58.3	41.6	
8.0	39 48.8	23.9	A
8.0	54.8	31.7	A
9.0	58.4	35.2	A
5.3	59.1	50.0	A
9.0	40 2.0	8.4	
8.7	25.0	51.0	A
8.7	36.0	54.3	A
9.3	36.3	15.7	B
9.4	38.7	2.5	
9.5	41 9.5	5.4	
9.4	36.7	14.3	
9.5	42 7.3	50.0	
9.0	15.5	42.2	A
9.2	39.5	17.8	
9.2	48.0	20.8	
9.0	58.3	2.8	

2817—2870			
	23h	+57°	
m	′ ″	′	
9.2	43 6.7	0.3	
9.5	48.5	40.2	
9.0	44 14.1	0.5	
9.4	14.5	28.8	
9.5	28.4	59.9	
9.4	41.0	10.1	
9.5	42.8	54.9	
9.5	45 32.3	48.7	
9.1	48.7	43.7	
9.5	47 4.1	24.7	
9.5	41.5	37.7	
8.8	52.4	23.2	B
7.2	59.8	17.3	A
8.8	48 10.4	16.4	A
8.7	50 13.5	3.5	A
9.0	16.3	50.1	A
9.5	51.5	42.2	A
9.5	52.1	22.7	
9.5	59.5	47.8	
9.5	51 13.0	12.4	
9.5	20.7	4.4	
9.2	21.0	23.1	
9.0	52 0.6	22.0	
9.4	21.3	40.6	B
8.5	52.0	4.5	
9.5	53 42.1	30.2	
9.4	50.0	52.0	
9.2	54 20.6	22.8	
9.5	55 8.0	39.7	
9.3	11.2	19.1	
9.0	48.6	21.3	
8.2	53.6	58.9	B
8.2	55.7	40.1	B
9.5	56 23.8	43.3	
9.4	42.5	55.4	
9.2	57 2.3	54.6	B
9.2	7.0	44.2	B
9.5	10.8	24.3	
6.5	27.0	43.3	S
8.8	33.5	7.2	
9.4	43.7	10.3	
8.8	46.0	22.8	
9.3	51.2	1.2	
8.0	58 12.3	30.8	B
8.5	12.5	22.3	
9.2	12.7	41.3	B
8.7	15.5	8.6	
9.4	21.8	42.4	
6.5	44.5	38.2	S
9.1	45.4	31.5	
9.2	59 6.8	56.9	
9.5	31.9	2.0	
9.5	43.2	15.3	
9.5	45.7	31.3	

Zone +58°

1—40				41—80				81—120				121—160				161—200			
	0u	+58°			0u	+58°			0u	+58°			0u	+58°			0u—1u	+58°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.0	0 45.0	25.7		9.0	16 8.0	4.8		9.3	29 10.3	11.6	B	9.3	42 25.5	52.5		9.5	54 39.9	42.3	
9.5	1 17.2	6.2		9.5	40.0	57.9		9.5	23.0	5.6		9.5	43 4.7	39.3		6.5	50.3	7.5	A
2.2	29.6	21.0	S	9.5	47.3	56.2		8.0	25.6	22.4	A	9.5	23.2	14.9		9.2	55 0.2	28.5	A
8.5	34.7	49.4	A	9.5	54.4	8.1		9.0	30 36.8	9.5		9.0	27.2	46.9		9.2	56.1	4.4	
9.0	37.9	49.2		9.4	17 1.5	9.3		9.4	31 12.9	20.4		9.5	34.3	23.9		8.8	56 18.8	32.5	
9.4	53.7	9.0		9.5	4.3	21.0		9.2	19.7	20.4		9.2	40.4	35.2		9.5	33.0	57.6	
9.4	58.3	57.8		9.5	8.5	58.3		9.4	56.3	6.7		8.8	46.2	56.2	R	9.5	34.3	46.2	
8.6	2 8.5	31.8		9.5	44.9	59.5		7.0	32 2.5	39.3	A	9.5	44 24.5	52.1		9.5	51.4	36.5	
8.9	26.8	50.5	A	8.7	18 8.5	18.0		7.3	9.6	42.3	A	9.0	44.3	58.4		9.5	57 37.0	40.7	
9.1	41.5	2.0		9.2	13.9	15.5		9.4	22.2	5.2		9.5	48.7	13.4		9.4	42.9	48.4	
7.3	3 1.7	51.2	A	8.5	25.4	23.5		9.5	31.0	14.3		9.3	51.1	22.5		9.5	46.4	43.0	
8.0	58.0	58.1	A	9.0	32.5	12.5		9.4	41.1	6.7		8.4	59.5	25.2	B	9.4	50.0	16.0	
9.5	4 29.4	22.5		9.3	46.3	12.5		8.8	48.6	3.7	B	9.5	45 15.5	58.7		8.8	58 0.3	30.0	
9.1	6 8.9	59.8	A	9.4	54.1	51.8		9.0	33 5.7	36.3	A	5.0	46 26.4	10.9	G	9.5	46.3	3.4	
9.0	18.4	11.4		7.1	19 23.3	57.3	B	9.1	10.9	9.4		9.2	47 31.5	12.8	B	9.4	59 5.9	39.2	
8.8	18.6	37.9		9.1	30.7	54.3		8.5	35 5.4	14.7	B	8.1	46.0	15.9	B	8.6	10.6	35.5	
9.5	44.9	24.0		8.9	20 13.4	17.5		9.5	57.3	34.8		9.5	48.3	40.3		9.5	0 28.4	54.4	
8.2	7 33.7	59.5	A	9.5	28.9	37.4		9.5	57.8	43.2		5.0	48 3.6	22.9	G	9.5	53.7	26.3	
9.3	49.8	20.5		9.5	21 0.2	1.4		9.5	36 0.0	27.3		8.7	4.9	56.1	J	9.5	1 12.2	16.2	
9.3	54.9	5.1		7.8	12.1	39.9	L	9.5	37 3.2	17.4		9.1	32.3	44.3		9.2	28.2	50.1	
9.4	55.1	47.4	A	8.8	44.6	6.1		6.5	38 17.4	46.9	L	9.5	49 31.2	43.8		8.2	31.1	11.4	B
8.0	8 7.1	38.4	A	8.0	53.8	27.5	L	9.0	39 5.3	30.6	B	9.5	41.0	51.7		8.6	42.3	48.0	
9.0	11.8	48.9	A	8.8	56.9	32.9		9.5	10.0	54.9		9.3	50 12.0	5.7		9.1	49.4	55.9	
7.8	10 5.6	15.1	B	8.5	22 0.4	18.0		9.0	11.5	30.8	B	9.5	14.3	31.4		9.3	53.4	10.2	
9.5	17.9	13.1		8.5	16.1	1.1		9.5	18.5	53.9		9.4	32.1	42.3		8.5	56.6	45.7	B
9.2	41.2	57.2	A	9.1	24.9	54.0		9.5	21.4	50.2		8.3	32.3	55.8	R	9.5	58.5	27.4	
9.3	11 7.1	59.7	B	8.7	38.1	49.4		9.5	24.0	56.2		9.5	50.4	30.2		9.4	58.5	14.6	
8.0	25.6	54.8	A	9.5	23 0.8	15.4		9.3	33.2	59.3		8.5	51 42.5	56.5	A	9.5	2 2.4	35.3	
9.2	29.8	35.9		9.4	6.0	41.8		9.3	43.1	56.4		9.4	46.6	53.7		9.5	17.7	31.1	
7.3	33.2	20.0	L	9.2	10.8	3.5		9.0	40 15.3	49.1		9.4	50.0	[illegible]		9.5	37.4	26.0	
8.9	43.2	18.3	B	9.3	31.9	49.9		9.5	41.7	30.8		9.4	52 10				45.5	51.2	
9.4	52.9	56.1		8.7	24 16.9	8.4		9.0	45.8	42.3		7.9	53 1				10.3	57.4	
9.4	12 2.6	19.8		9.3	26.3	28.9		9.5	41 3.2	38.4		9.4	2				[illegible]	28.6	
9.5	37.7	28.0		9.0	25 7.7	21.4		9.5	5.0	57.3		9.5						[illegible]2.4	
9.5	13 40.0	7.1		8.5	26 14.0	3.4		9.4	28.5	54.4		7.7						.4	
9.5	45.8	17.9		9.4	27 0.8	6.0		8.9	34.0	35.4		9.5						.5	
9.4	14 25.9	38.4		8.7	6.4	31.2		9.5	49.0	33.2		8.5						.1	
8.5	39.6	52.1		9.4	52.2	40.8		9.5	52.8	43.0		8.0						.7	L
8.9	15 30.7	48.4		8.9	54.4	42.8		8.0	58.3	52.1	R	9.5						.5	B
9.0	35.4	5.0		9.5	28 18.5	37.3		9.5	42 14.7	19.9		9.5						8	

201—260				261—320				321—380				381—440				441—500			
	1ᵘ		+58°		1ᵘ		+58°		1ᵘ		+58°		1ᵘ—2ᵘ		+58°		2ᵘ		+58°
m	′	″	′		m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	
8.0	5	53.0	59.0	B	9.5	24	40.0	57.3	9.5	44	32.0	22.0	9.3	58	39.5	38.7	9.5	9	17.8	46.7	
9.5		57.0	54.5		9.5		45.8	18.1	9.4		57.9	38.6	9.5	59	16.0	36.5	8.0		26.3	51.4	B
7.9	6	37.1	31.5	B	9.1	25	23.6	40.2	9.1	45	1.1	12.6	8.7		19.9	5.4	A	9.5		36.7	23.8	
9.5		54.1	1.5		9.0		36.8	27.9	9.5		7.0	16.3	8.5		23.0	56.0		9.4		41.5	39.6	
9.5		56.2	2.9		8.7	26	17.9	24.7	8.1		13.6	47.6	L	9.3		31.1	25.1	A	8.8		55.6	59.6	
9.4	7	16.8	0.5		7.5		45.3	42.9	L	9.4		18.3	2.3	9.3		32.2	12.9		8.5	10	21.4	55.9	
9.5		24.9	28.1		9.4		56.0	2.1	9.4		20.4	12.7	9.5		44.5	9.7		9.5		31.1	58.3	
9.5	8	0.4	8.1		7.2	27	15.2	53.0	L	9.5		25.1	42.3	8.0		53.0	27.5	A	9.0		38.3	57.6	
9.1		3.1	5.8		8.7		29.0	48.4	9.4		30.3	12.9	8.4		56.5	14.9	A	9.0		47.3	58.2	
9.1		18.1	7.7		7.3	28	24.5	33.5	L	8.5		32.3	54.0	L	9.3	0	50.7	19.0		7.5		49.9	34.8	B
9.5		51.9	24.2		9.5	29	54.1	17.2	7.5		48.0	33.6	A	8.9		54.2	33.1		9.4		56.9	47.2	
9.5	9	4.5	40.2		8.4	30	14.9	50.7	R	9.5	46	28.7	23.7	8.8	2	0.3	20.9	A	8.7	11	15.5	6.7	
9.5		6.7	52.9		7.2		54.6	18.7	L	9.3		32.9	17.3	9.5		7.6	56.9		9.5		32.5	38.8	
9.5		40.8	12.8		9.0	32	2.9	51.4	A	9.2		33.9	28.7	A	9.5		30.4	42.6		9.5		39.6	31.3	
9.5		46.7	18.2		9.5		13.2	40.6	9.5		54.6	6.1	8.6		34.3	44.3		9.0		41.2	53.0	
9.2		57.1	6.6		9.5		27.6	16.6	9.5	47	15.8	5.0	8.2		39.7	51.2	B	7.3		51.7	29.6	R
8.4	10	10.9	16.8		9.5		30.2	37.5	9.5		41.7	27.5	8.2		54.8	7.3	A	8.6	12	54.2	9.7	R
9.5		19.1	12.6		9.5		43.0	49.0	9.5		46.2	14.8	9.5	3	0.3	38.0		9.4	13	2.6	17.9	
9.5	11	1.8	58.2		9.5		51.0	47.1	A	9.3		57.8	25.0	8.1		12.9	30.7		9.5		21.0	45.7	
9.5		2.1	54.6		9.5	33	13.3	30.9	9.1	48	12.5	54.5	9.4		20.8	29.2		9.4		37.5	30.5	
9.5		41.4	10.5		8.1		29.7	14.3	7.0		17.3	55.0	L	9.2		26.3	56.2	B	9.5		57.6	33.4	
9.5	12	18.8	38.1		6.5		39.9	54.1	A	8.6		29.9	33.2	A	8.9		40.0	3.7	A	9.1	14	2.0	35.9	
9.4		23.6	8.9	R	8.9		51.6	17.6	9.4	49	7.0	13.9	8.5		40.8	42.8		9.5		15.5	25.0	
9.2		26.5	45.8	R	9.0	34	21.8	5.3	9.5		21.1	34.7	9.5		42.8	56.9		9.5		47.2	48.2	
9.2		56.2	7.3	R	9.4		27.7	52.5	8.2		51.4	27.3	A	9.4		45.1	58.3		9.5	15	2.0	52.0	
9.0	13	44.2	38.2		9.4		33.0	49.9	B	8.8		52.0	52.0	9.5	4	14.5	28.5		9.5		24.5	35.4	
9.1	14	46.5	58.6		9.5		43.2	49.4	B	8.6	50	15.6	0.5	A	9.5		18.0	20.7		8.0	16	18.1	12.6	L
9.5		54.3	31.5		9.5		48.1	25.8	9.5		18.5	4.1	9.0		22.1	42.5		8.8		19.5	27.5	A
9.5	15	6.0	33.9		9.5		57.5	2.3	9.5		25.5	25.5	9.0		29.5	57.9		9.4		22.1	2.9	
8.0		6.7	11.1	A	8.8	35	20.0	38.1	8.8		29.0	57.0	9.2		43.6	55.2		9.5		36.8	48.2	
9.5		6.9	11.6	A	9.1		21.0	3.6	9.5		42.9	16.0	9.2		45.0	22.2		7.5		50.3	27.5	A
8.7		10.5	0.3	A	9.3		51.1	27.9	8.7	51	2.7	40.9	9.0		45.8	49.5		8.4		57.4	19.6	A
9.5		23.2	37.7		9.5		55.2	38.5	9.2		11.0	33.5	9.1		51.9	25.7		9.5	17	25.8	19.6	
9.5		32.1	37.4		9.5	36	19.2	22.4	9.4	52	2.5	27.6	9.3		56.2	39.1		9.4	18	6.0	58.3	
9.4	16	5.7	37.9		8.9		32.2	29.6	9.4		10.7	23.9	9.4	5	3.7	28.6		9.0		31.1	46.7	A
9.1		41.5	57.7		8.9	37	2.5	56.5	A	8.2		30.3	59.1	B	8.8		10.8	41.9		9.2	19	28.1	26.0	B
9.5		50.1	14.9		7.0		5.2	25.7	B	9.3		37.0	39.4	8.5		12.0	33.6		9.3		29.1	28.0	
9.3	17	2.0	11.4	A	9.5		7.6	52.1	9.4	53	0.6	19.6	8.9		14.2	51.9		9.1		49.0	45.7	A
9.5		49.2	44.3		9.5	38	6.2	17.7	8.8		24.3	7.9	B	9.3		14.4	48.5		8.4	20	44.2	11.5	
9.5	18	3.5	55.7		8.5		23.5	55.8	R	9.0		50.3	52.0	9.5		20.8	24.6		9.5		45.4	58.2	
9.5		35.4	28.6		9.4		33.1	36.8	9.4	54	29.0	34.7	8.9		33.7	43.4		9.0		50.0	35.9	A
9.5		47.8	41.2		9.3		46.6	52.2	9.5		32.8	45.0	9.5		48.0	53.2		9.5	21	23.0	26.0	
9.5	19	12.4	26.8		9.0	39	0.3	24.3	9.4		40.3	8.7	9.5		49.0	57.8		9.3		24.2	52.0	
9.5		25.0	48.6		9.4		5.5	14.6	9.4		45.9	18.1	9.3		58.9	39.4		9.5	22	3.5	51.6	
9.5		25.0	55.2		8.5		36.8	2.7	L	9.5		46.6	25.5	9.5	6	12.5	48.4		7.0	23	18.8	34.2	L
9.5		49.1	43.7		8.9		45.0	45.1	9.4	55	4.3	24.5	9.5		15.1	36.7		8.8		21.0	31.7	L
9.4	20	1.9	21.0		9.4	40	19.6	47.0	9.5		15.5	17.6	9.4		40.4	36.0		9.0		56.0	43.7	
9.5		23.5	50.4		8.4		26.9	47.8	B	9.5		23.4	37.4	9.0	7	5.0	40.8		9.5	24	0.3	53.0	
7.6		34.7	0.7	R	9.3		37.2	55.0	9.5		32.1	13.2	9.5		9.2	39.1		9.4		10.8	54.0	
9.5		40.3	1.0		9.5		41.5	31.3	9.5		59.4	29.7	9.5		10.7	25.9		9.4	25	29.5	31.0	
9.0	21	12.8	39.7		9.4		59.1	55.0	9.5	56	13.5	0.0	8.5		11.8	51.6	B	9.0		43.0	26.1	
9.4		36.7	58.9	R	9.3	41	36.4	47.6	9.5		19.2	35.3	9.5		11.8	50.7		9.5		59.8	43.7	
9.5		47.1	44.1		9.5	42	15.6	40.2	9.0	57	5.9	5.4	A	9.4		36.1	41.8		9.4	26	25.9	39.3	
9.5		54.6	41.9		9.5		41.0	8.7	9.5		20.0	30.0	9.4		37.3	13.4		9.2	27	3.5	36.9	A
9.5		57.2	55.0		9.4		59.9	51.3	8.6		23.4	6.5	A	9.4		41.3	45.1		9.5		12.5	38.4	
9.0	22	16.6	37.7	B	8.7	43	10.4	22.9	9.0		32.3	56.0	9.1		55.7	46.0		9.5	28	17.1	4.9	
9.1		37.0	42.7		9.5	44	4.1	50.0	9.0		45.6	48.2	8.7		58.8	42.0		7.8		30.4	12.3	A
8.0		51.9	24.2	B	9.3		6.1	35.4	9.0	58	12.8	54.3	9.0	8	36.7	31.2		8.3		39.5	26.1	A
9.2	23	3.4	21.1		9.0		18.6	31.6	8.5		24.1	10.3	A	9.1		59.9	16.7		9.0		50.0	11.8	A
6.0	24	29.6	29.4	G	9.0		23.5	18.7	9.5		39.0	23.9	8.5	9	9.4	37.8		9.4		57.9	31.9	

501—560				561—620				621—680				681—740				741—800			
	2ᵘ		+58°		2ᵘ—3ᵘ		+58°		3ᵘ		+58°		3ᵘ—4ᵘ		+58°		4ᵘ		+58°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.5	28	59.1	57.8	9.5	56	54.5	36.8	8.9	22	57.2	52.0	9.5	49	35.0	6.8	8.8	13	48.4	0.0
9.0	29	25.3	1.5	A	9.1	57	40.4	47.5	9.0	23	2.8	9.5	9.5		54.3	9.2	9.5	14	6.9	30.6
9.3	30	16.1	12.5	B	8.1	58	4.0	48.6	A	8.4		8.3	5.5	A	9.5	50	25.9	45.8	9.2	17.8	56.6	A
7.0		51.5	20.7	L	8.0		8.5	11.3	A	9.5		39.2	16.7		9.0		44.6	42.0	B	9.4	34.1	22.5	B
9.1	31	0.7	46.2		8.8		15.9	0.5	A	9.5	24	26.2	14.7		8.0		45.1	31.8	G	9.5	16	0.7	9.4
8.5	32	0.7	32.4		9.0		51.5	19.7		9.2		35.0	43.3		9.5		52.3	46.2		9.4		4.6	2.3
9.2		5.2	26.6		8.0		58.1	57.9	B	9.5		38.9	46.9		8.7		54.3	30.2	G	8.7	17	10.9	11.8
7.5		22.0	13.8	L	8.9	59	36.5	59.8		9.0	25	48.3	11.2		9.4	51	20.9	3.7		9.1		11.9	8.5
9.4		40.6	17.7		8.7		41.0	31.9		9.5		49.1	5.5		9.5	52	0.0	59.7		9.3		14.9	2.2
8.5		47.0	36.9		9.4	0	18.0	5.4		9.0	27	19.4	49.2		5.0		25.5	44.7	G	8.8		41.2	1.9
9.5	34	0.0	14.2		9.4		26.7	22.0		7.4		37.3	47.1	A	9.4		25.9	43.8	B	8.4		45.1	38.6
9.3		51.3	42.8	B	8.2		41.6	10.8	B	7.1		46.0	58.2	A	9.4		31.2	35.0		8.4		47.9	19.6
9.4	35	1.9	41.0		9.0		48.8	16.3		7.8		51.4	53.6	A	9.5		54.8	5.3		8.4	19	9.8	47.9	A
9.4		8.0	22.5		9.3	1	46.0	23.0		9.1	28	2.0	31.8		8.0	53	0.9	15.0	A	9.4	20	18.4	1.0
9.3		34.4	58.2		9.2	2	37.5	44.2		9.5		8.9	28.5		9.2		41.1	35.2		9.3		29.2	55.5
9.5		50.0	5.7		9.4	3	11.5	11.3		9.5		17.8	23.3		9.5		48.3	20.5		9.0	21	18.8	22.4
9.0	36	12.0	40.8		8.8		16.4	26.1	B	6.5	29	29.3	22.3	B	9.5		58.0	22.7		9.0		40.3	32.2
9.0		25.5	43.3		9.3		32.6	32.4		8.9	30	21.6	16.5	B	8.4	54	7.2	53.1	A	9.0	23	8.3	18.5
9.1		53.6	1.5		8.9	4	21.8	12.2		9.5		32.6	15.5		8.7		18.6	51.7	A	9.3		53.4	55.5
9.5	37	22.5	40.3		9.1	5	10.0	43.9		9.5	31	27.9	31.8		9.3		20.8	37.0		9.5	24	52.9	6.6
7.2		33.0	12.8	R	8.5		41.6	36.0		9.5	32	3.9	40.3		9.2		29.0	45.1		8.8	26	19.7	21.9
9.5	38	51.2	53.2		9.1	6	4.4	45.9		9.5		8.5	28.0		9.5		56.0	3.8		9.4		27.0	52.3
8.5		59.0	36.9		8.4		19.0	14.7		9.5		10.0	53.1		9.5	55	13.8	21.8		9.5	27	37.7	5.1
9.4	42	6.5	55.9		9.4	7	16.3	4.5		9.5		23.1	21.3		9.3		56.0	29.7		9.4	28	12.2	27.3
8.0		15.3	9.2	A	9.4	8	59.2	17.2		9.5		29.0	16.5		9.4	56	7.9	41.2		9.4	29	32.3	3.7	A
9.1		34.4	0.8	A	9.3	9	4.3	5.0	A	8.4	34	0.9	23.4	A	9.5		26.0	50.9		9.0		52.7	28.3
9.0	44	39.9	59.6		9.0		18.9	19.2	A	9.2		5.1	58.8		9.5	57	13.0	48.6		8.6	30	14.2	38.1
8.5		39.4	0.8		8.4		44.5	38.2	A	9.3		28.8	22.4	A	7.5		25.6	9.5	L	9.5		28.7	41.0
9.4		59.0	45.7		9.1	10	22.4	32.5	B	9.3		36.5	1.7		9.2		53.1	4.1	B	8.5		30.5	8.3	A
9.0	45	18.9	16.7	B	9.3		27.2	33.7		8.9	35	9.2	29.9	A	9.4		59.3	31.0		8.5	31	18.6	15.5	A
9.5		19.4	17.0	B	9.2		56.5	23.0		9.3		30.0	17.8		9.5	58	32.8	15.5		8.9		22.6	35.6	A
8.2		26.3	33.5	B	8.8	11	13.5	48.6		9.3	36	9.2	29.5	A	9.3		54.0	39.6		9.4	32	47.7	20.9	
8.9		45.8	29.3	B	9.5		30.0	33.9		9.1		34.6	51.6		9.3	59	7.7	4.8		8.4	33	11.9	4.9	B
8.9		49.5	29.8		8.2		51.5	12.2	A	9.4	37	17.6	25.2		9.5		26.9	58.9		9.4		36.1	3.0	
8.8		52.0	0.0		9.2	12	0.7	28.9	A	9.5		27.9	31.0		8.4		52.8	22.8	L	8.0	35	42.5	58.3	L
9.4	46	6.0	50.1		6.9		7.0	11.7	A	9.3		30.3	28.3	B	9.4	0	28.5	29.6		9.2	36	13.7	48.8	
9.5		17.5	45.7		9.4		42.3	24.5		8.8		46.0	18.9		9.4		34.3	28.8		8.2		20.0	7.4	L
9.0	47	18.0	38.9		9.1	13	48.0	44.1		9.3		46.0	4.2		9.3	1	41.9	43.0	B	8.8		39.2	23.8	
9.3		47.9	8.7		7.4		52.5	10.7	A	9.3		51.6	49.9		9.4		44.7	51.3		9.1		43.9	10.0	
7.2	48	15.4	59.9	A	8.2	14	13.4	54.9	B	9.5	38	14.8	30.9		9.5	2	50.4	30.6		9.2		46.7	11.4	
9.3		58.5	58.4		9.0		50.0	22.0		9.3	40	50.7	57.3		9.5		53.1	52.2		9.5	38	35.7	2.1	
9.5	49	0.1	2.7		7.8	15	52.9	40.9	B	9.5	42	1.7	31.6		9.3	3	22.4	25.1		9.0	39	31.8	49.4	
9.3		4.5	14.7		9.4	16	12.1	30.4		8.8		31.5	13.2	A	9.5		24.9	19.8		9.5	41	18.9	29.3	
9.1		10.7	46.2		9.5		49.8	3.3	B	9.1	43	13.0	41.9		8.7		26.6	9.3		9.4		19.2	21.4	
9.4		23.5	49.1		9.3	17	12.4	5.9		9.1		21.7	29.1		9.5		51.4	35.5		8.0		48.4	23.3	B
8.2	50	3.5	27.1	S	9.3		52.5	54.1		9.5		33.1	32.9		9.0	5	26.9	45.3	A	9.5	42	51.8	5.0	B
9.3		24.0	45.7		5.0	18	21.9	22.1	A	9.3		55.8	3.2		7.1		49.3	24.7	A	7.9		52.8	35.5	B
9.3		42.0	16.2	B	6.6		33.6	51.7	S	9.4	44	1.5	59.6		9.1		54.9	43.3		7.0	44	37.1	51.8	A
9.2	51	15.2	41.3		9.3	19	18.0	37.5		9.5		12.7	19.4		9.4	6	10.3	53.8		9.2	45	31.7	59.7	
9.5	52	11.3	4.4		9.3		21.2	44.3		9.0	45	0.7	2.5		9.5		25.3	57.3		7.5		54.3	22.9	B
7.8		26.0	51.5	L	9.5		52.3	47.1		9.5		13.8	57.1		9.4	7	5.0	58.7		9.3	46	43.3	26.7	B
9.4		40.5	15.8		9.0		55.6	11.8	A	8.2	46	35.9	11.9	A	9.1		47.3	15.0		9.5	47	4.2	12.2	
9.5	53	4.6	0.2		9.5	20	18.1	30.7		9.4		39.4	54.4		9.5	8	7.2	10.9		9.4		31.8	29.7	
8.8		16.5	51.1	A	9.5	21	14.0	49.0		9.5		59.7	56.0		8.8		14.5	14.2	B	9.3		46.6	25.8	
9.5		57.7	44.7		9.5		16.9	36.2		9.5	47	35.8	58.1		9.3	9	18.4	20.2		9.5	48	6.7	9.0	
8.2	55	49.3	1.8	L	9.2		20.8	20.0		8.6		51.6	3.6	A	9.5		27.3	48.2		8.0		38.6	25.9	
9.5	56	26.0	26.1		8.0		42.8	55.8	B	9.5	48	9.9	17.9		8.7	11	32.6	8.6	A	9.5	49	12.7	34.1	
9.3		33.2	44.4		8.2		54.6	16.2	A	9.4		34.0	52.2	B	8.1	12	47.7	14.4	A	9.4		15.2	37.[illegible]	
9.4		42.6	44.1		7.0		56.6	16.4	A	8.8		41.2	52.0	B	9.3		56.1	31.4	A	8.8		30.1	2[illegible]	
8.7		53.5	44.7	A	9.5	22	32.5	32.6		9.5	49	21.8	18.3		9.5	13	43.4	48.7		9.0	51	29.1	[illegible]	

801—860				861—920				921—980				981—1040				1041—1100			
	4u—5u	+58°			5u—6u	+58°			6u	+58°			6u—7u	+58°			7u	+58°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.5	52 2.5	39.0	A	9.2	36 46.5	37.2		9.1	11 31.0	21.0		9.4	43 37.2	13.0		8.5	18 7.7	30.2	A
9.5	13.5	2.5		9.5	37 27.2	41.3		7.6	12 57.9	29.9	B	5.0	44 42.7	36.6	A	9.3	36.3	13.5	
9.3	35.4	6.3	A	6.5	39 33.1	54.0	A	8.0	13 19.0	39.8	A	9.2	45 0.9	7.4		9.5	19 35.4	12.2	
6.0	53 34.5	45.0	A	9.1	54.9	41.8		8.0	47.5	48.2	A	9.0	8.2	29.3	A	9.5	40.3	31.7	B
6.5	38.2	48.8	A	9.5	55.4	32.0		8.0	56.0	29.0	A	8.9	12.8	5.6	B	8.6	20 29.3	49.8	A
9.2	54 55.3	13.5		8.9	41 11.0	58.0		8.0	14 5.4	52.0	A	8.7	38.3	46.9	A	9.0	21 15.6	7.4	
8.4	59.2	22.9		8.5	27.2	43.5		6.0	13.0	29.5	A	8.5	44.7	54.2	A	8.9	49.2	1.2	
9.2	55 14.1	9.0		8.5	38.0	11.7		9.5	15 1.0	17.2		8.1	54.9	4.6	B	9.5	23 49.2	11.1	
9.3	29.8	8.1		9.0	58.5	22.1		9.2	42.5	31.5		9.0	46 37.8	0.2		9.2	58.0	24.3	
9.5	49.7	49.3	A	9.5	43 9.0	11.3		9.2	45.7	39.8		9.4	47.7	23.8		8.8	25 1.7	15.0	
8.8	56 25.5	28.3		8.5	15.2	59.8		9.1	16 7.3	4.3		9.1	51.2	32.2	A	9.5	26 9.6	10.5	
9.1	40.6	44.5	A	8.5	32.0	0.4	A	6.3	18 13.0	16.2	A	9.4	49 29.3	9.6		9.2	18.3	30.2	
9.5	42.7	34.6		8.8	44 24.5	30.5		9.0	31.2	14.2		9.4	50 0.3	54.2		9.5	27 30.8	11.5	
9.1	57 4.2	51.9	A	9.3	25.1	31.8		9.2	19 4.8	36.2	B	7.7	48.5	7.7	A	9.5	28 15.9	45.9	
9.2	52.4	44.4	A	8.3	35.3	9.3	A	9.0	23.5	24.0		9.5	52 37.6	5.6		9.5	41.4	29.3	
9.3	58 47.7	26.8	B	9.4	43.0	39.4		9.0	20 14.0	50.6	A	9.5	41.8	17.0		9.1	30 55.7	12.5	
9.0	53.8	57.7	A	9.5	48.2	15.2		9.5	46.0	10.8		9.0	54 13.7	33.2		8.5	31 5.8	40.1	B
8.9	59 1.7	50.4	A	9.0	55.6	29.5		9.5	21 17.7	0.5		8.5	55 18.2	44.4	A	9.5	58.7	38.3	
9.1	53.4	31.2		9.5	45 9.0	12.3		9.3	45.5	35.4		9.5	56 56.2	27.6		9.4	32 44.5	57.0	
9.5	56.3	6.4		9.5	23.5	55.0		8.5	22 41.0	9.6	B	9.4	57.0	30.8	B	9.3	55.6	30.5	
8.0	0 40.0	28.8	B	9.4	47.0	4.3		7.9	23 1.4	5.5	G	8.0	57 9.2	11.5	A	9.3	33 49.7	33.6	
9.5	2 13.8	3.9		9.1	49.1	32.4		8.0	33.0	54.5	A	8.9	27.9	19.4		9.5	34 6.3	43.4	
9.3	47.5	37.2		9.5	46 39.8	7.4		6.8	39.4	12.7	G	9.5	58 37.4	22.0		9.5	17.2	25.8	
9.3	3 31.8	34.8	B	8.8	44.0	52.5	A	9.5	24 6.0	14.7		9.5	59 2.6	46.9		8.4	25.4	52.3	F
9.3	32.5	3.5		9.4	48 49.7	32.9		9.0	34.5	47.7		8.0	5.8	14.5	A	9.5	34.0	47.4	
9.5	4 22.2	48.3		9.3	50 20.0	39.3		9.0	57.1	36.3		9.4	12.3	41.0		9.3	36 50.5	2.9	A
9.2	32.2	54.2		9.0	30.2	12.2		9.4	25 35.2	36.9		8.8	1 14.7	11.0		9.3	37 2.9	35.9	
8.3	7 52.5	11.4	A	9.0	47.4	27.5		8.7	26 21.2	35.9	B	8.6	21.2	29.3		9.2	38 11.5	31.4	
8.9	8 43.3	50.4		8.8	51 20.8	52.9		8.1	27 14.5	12.3	A	9.4	28.8	57.7		9.2	56.0	21.0	
9.2	9 36.2	58.1		9.5	55.6	38.3		9.5	22.0	58.0		9.5	2 4.2	15.5		9.5	39 20.1	16.5	
9.5	10 14.3	11.5		8.0	52 43.0	42.8	A	9.1	28 2.0	33.4		9.1	11.7	4.6	A	9.5	41 31.0	12.3	
9.5	31.9	37.4	B	9.1	48.8	29.5		9.5	26.1	1.8	B	9.4	34.7	45.4		7.5	39.2	34.8	L
7.5	11 1.7	47.5	A	9.0	54 2.0	38.9	A	8.9	26.4	8.4	A	9.5	3 26.5	42.5		8.5	43 31.0	52.4	A
9.4	25.8	18.5		9.0	23.5	56.0		8.7	30 21.4	7.9	A	9.3	29.3	24.7		9.2	44 5.5	30.2	B
9.5	12 38.8	8.9	B	8.6	43.4	56.4	A	8.6	23.2	25.4		9.4	37.4	13.8		8.7	14.0	20.5	A
8.8	13 8.7	46.9	A	9.0	56 49.3	43.8		9.3	28.5	47.6		9.3	4 36.3	14.6		9.0	56.6	49.7	A
9.4	45.9	28.1		6.0	57 14.0	54.9	A	8.6	31.3	25.1	B	7.1	57.2	17.9	A	9.5	45 54.5	10.3	
9.3	46.2	29.6	B	9.5	26.7	12.6	B	9.5	51.4	27.7		9.5	5 25.4	20.8		9.2	46 49.6	57.4	
9.3	14 6.0	0.9		9.3	58 45.2	54.5	A	8.8	31 2.8	36.3	A	9.4	6 39.0	51.2		8.8	47 17.0	41.7	
8.0	15 46.9	33.3	A	9.5	59 30.0	23.5		9.0	39.4	4.3		9.5	55.7	19.0		9.2	52.6	17.1	
8.8	16 51.2	23.3	A	9.3	31.4	53.0		9.0	51.6	51.0		9.4	7 9.3	43.0		9.0	48 44.5	41.7	
8.5	17 50.7	33.7	A	9.5	50.3	59.0		8.5	32 10.3	20.8		8.9	36.1	51.4	B	9.5	49 23.5	4.7	
9.0	19 30.5	36.7		9.5	0 12.0	21.6		9.5	33 14.0	52.1		9.4	55.4	5.8		8.7	57.9	26.6	A
8.6	23 41.6	6.1	A	9.5	12.3	30.5		9.3	36.8	4.8		9.4	8 8.4	6.8		9.5	50 30.0	8.7	
8.4	25 0.9	27.0	B	9.5	1 40.4	33.8		9.4	56.2	11.8		9.5	11.0	7.1		9.3	51 56.7	54.9	
8.5	6.5	15.9		9.5	2 3.5	17.7		9.2	35 7.3	43.4		9.2	11.1	1.1	B	9.5	52 2.8	45.3	B
9.0	27 7.9	47.3	A	9.3	50.0	4.3		9.5	25.2	46.9		9.4	26.3	0.6		9.2	10.0	56.4	B
9.1	29 29.1	6.5		9.4	3 20.9	18.6		9.5	48.4	6.4		9.5	42.7	32.7		9.5	30.3	14.4	
9.5	31 30.8	33.6		9.5	27.0	36.9		9.5	36 35.4	51.3		9.3	9 2.0	1.6		9.1	47.0	23.7	A
9.4	55.4	39.8		9.4	59.5	12.5		9.5	38 31.8	12.0		9.5	10 17.5	3.2		8.5	55.6	49.4	
9.4	33 2.3	5.0		9.0	4 44.5	30.9		8.0	35.6	34.6	B	9.4	25.6	17.0		9.1	53 9.9	15.4	B
9.5	19.5	59.0		7.6	45.0	52.5	A	9.0	39 19.7	52.2	A	9.2	57.2	18.0	B	9.4	14.1	25.0	B
9.5	23.7	51.9		8.8	5 39.0	21.6	A	8.8	40 50.4	0.4	A	9.5	11 52.6	33.3	B	7.5	21.4	11.4	A
9.5	42.0	0.4		9.0	45.0	47.1	A	9.5	41 3.0	20.4		9.5	12 0.7	39.0		8.6	54 5.0	34.2	A
9.5	34 20.0	17.7		9.3	6 41.3	23.1		9.5	21.4	7.1		8.8	47.8	36.1		8.9	56 42.5	42.0	B
7.3	28.0	43.6	A	9.3	7 43.7	45.2		9.5	24.8	45.4		9.3	14 5.4	36.6		9.3	44.5	34.7	
8.0	28.0	53.8	L	9.5	10 6.0	21.8		9.5	44.2	37.4		9.5	15 50.4	49.3		9.4	58.5	54.3	
9.5	35 7.7	24.6		9.5	25.4	2.2		9.3	42 8.8	3.7	A	9.4	16 23.2	30.8		9.0	57 7.0	23.0	
8.9	40.0	21.4	B	9.4	34.2	27.4		9.3	28.7	5.1	A	9.3	32.1	25.0	B	9.2	27.8	43.3	A
9.4	36 35.5	42.9		9.4	11 5.8	19.0		9.5	35.4	2.9		9.4	58.9	27.2		9.2	31.3	44.8	B

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	7ᵘ—8ᵘ		+58°		8ᵘ—9ᵘ		+58°		9ᵘ—10ᵘ		+58°		10ᵘ—11ᵘ		+58°		11ᵘ—12ᵘ		+58°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.5	57	38.5	44.8	B	9.3	46	54.1	36.6		9.5	45	17.5	42.8		6.3	37	17.1	7.3	A	9.4	45	49.7	56.4	
6.2	58	10.5	40.6	A	8.5	48	4.2	46.3	A	9.4		19.6	33.5		9.5	38	24.5	14.2		8.5	46	44.1	54.8	
8.2	59	7.8	48.9	A	8.8		59.5	40.2	A	9.0	46	52.0	36.5	A	7.7	39	32.8	4.7	A	9.3		55.0	58.3	
9.5		53.5	10.6		9.5	49	20.4	51.9		6.2	47	5.5	5.5	A	9.5	40	31.2	30.0		9.4	48	32.3	56.4	
9.4	1	50.0	18.0		9.1	50	21.0	40.5		9.3		34.8	55.8	B	9.5	41	45.6	57.4		8.3		35.5	58.7	B
9.4	2	43.3	8.1	A	9.5		34.4	12.5		9.5		38.5	56.0		9.0	44	0.0	29.2	A	7.5		56.1	40.3	A
9.5	4	53.3	36.7		9.1		37.2	38.9	A	9.2	48	23.0	41.3		9.4		13.0	55.9		9.3	51	24.2	16.1	
9.3	6	30.0	9.1		9.5	53	15.0	40.0		9.5		53.0	6.9		9.5		34.5	23.5		9.3		27.3	57.9	
9.5		34.4	6.7		8.7	54	14.0	40.2	A	9.3	52	46.2	9.0		9.0	45	31.5	39.3	A	8.3	52	50.2	17.1	
9.3		47.6	30.8	B	9.5	55	15.2	8.1		8.4		51.3	32.9	A	7.3	47	33.4	15.7	A	8.6	54	28.6	45.5	A
9.5	7	39.4	6.6	B	9.3	56	6.8	39.6		7.4	53	9.8	48.1	A	9.1	48	31.9	11.7	B	9.3		34.7	44.4	A
6.2	8	43.5	10.8	A	9.5		32.9	43.9		8.7		25.7	14.1	A	9.1		47.0	57.4	A	9.0	55	29.7	14.2	A
9.5	10	42.5	1.9		9.0	57	43.5	19.7	A	8.1	54	5.4	9.6	A	9.5	50	42.3	5.0		9.5	56	15.5	8.1	
9.5	11	23.3	45.5		8.9	59	8.4	33.9	A	9.1		34.1	31.9		8.8	52	36.8	43.6	A	9.5		36.6	48.5	
9.5	12	43.7	33.3		9.0		34.5	34.2	A	9.4	55	36.8	47.6		9.4		46.4	16.0	B	8.6	57	26.7	55.9	
9.5	13	7.5	48.5		9.0	0	20.5	1.9		9.3		38.9	44.1	B	8.6	54	31.4	11.5	A	9.4	58	38.5	4.7	
9.5	14	9.8	25.4		9.4	1	18.4	55.7		9.3		56.3	12.2		9.2		45.3	28.9	B	9.3		59.2	0.0	
9.4		46.4	11.7		9.4		25.9	46.4		9.5	58	9.3	16.6		8.0	55	43.4	7.4	A	7.3	59	24.6	24.4	A
9.5	15	31.3	48.4		9.4	2	12.0	7.0		8.9		25.3	58.4	A	9.3	56	49.3	5.5		9.4	2	2.3	46.9	B
8.1		48.8	39.4	B	9.5	3	53.6	30.6		9.3	59	5.4	31.4		9.5	57	38.0	27.2		8.3		49.6	29.9	R
9.5		50.3	3.8		9.5	5	17.8	0.6		9.5		12.8	41.7		9.3		54.2	18.9		9.1	3	32.5	40.2	A
9.5	18	39.9	42.3		7.1	6	59.5	5.2	A	9.0		18.7	50.6	A	9.5	58	39.5	14.3	B	9.3		52.2	20.6	
9.3	19	13.0	39.7		7.5	7	8.1	30.6	A	9.3	3	22.0	13.5		8.0	0	27.9	24.8	A	8.8	4	24.2	49.0	A
9.3		35.5	57.2		8.7		9.3	39.8	A	7.0		37.3	42.1	A	7.0		37.7	39.1	A	9.4		46.7	49.5	A
9.2		38.4	45.4	A	8.8	11	9.0	16.8	A	9.0	6	53.5	21.1	A	9.5		54.5	0.5		8.3	8	30.6	24.5	
8.8		40.5	25.1		9.3		24.0	21.2	A	9.3	7	26.8	13.2	A	9.2	1	8.4	1.4	B	9.5	9	9.3	57.3	
9.5		54.6	54.8		9.3	12	19.6	11.5		9.4		54.8	59.4		9.1	3	14.0	4.8	A	9.0		44.2	13.1	
9.5	20	19.5	37.7		9.5		26.4	47.3		9.3	9	12.4	40.4		9.5	4	50.1	46.0	B	9.5	10	45.9	15.1	
9.5		44.6	0.7		9.5	15	56.8	5.9		9.1	10	25.5	38.3	A	9.5	6	41.0	8.1		9.5	11	49.6	51.4	
8.8	21	47.0	58.2	B	7.8	16	37.0	45.8	A	9.0	11	43.6	8.8	A	9.4	7	15.7	55.3	B	9.5	12	35.5	21.6	
9.5	22	0.5	3.3		9.2		53.0	15.4	A	9.5	12	22.7	0.1		9.5	9	18.8	18.4		6.0	13	48.0	39.8	G
9.3		4.0	18.5		7.5	19	9.0	45.3	A	8.5		38.3	50.6		9.4		50.0	55.2		8.7	15	13.1	52.9	G
9.5		14.9	40.6		9.4	20	27.0	28.6		9.5	13	55.0	50.6		9.4	10	22.6	42.9		8.2	17	1.5	34.3	A
9.3		56.1	58.2		9.5	21	40.4	2.6		9.1	14	13.5	31.9	A	9.5	11	29.5	58.8		8.5		54.0	9.5	
9.4	24	49.2	33.7		9.4	22	3.0	21.3		9.0	17	34.8	13.7	A	8.8	15	32.9	8.5		9.3	18	24.5	33.0	
8.3	25	24.5	41.2	A	9.2	23	27.4	51.7	A	9.5		37.4	56.6	B	9.5		37.0	28.4		9.2		30.4	29.3	B
9.3		48.3	46.0		9.3		36.5	55.1	A	8.9	18	39.0	23.0	A	9.4	17	35.7	58.5		9.5	20	12.1	23.4	
9.5	27	27.0	22.5		9.4	24	18.0	33.5		9.5	19	30.4	29.0		8.8	19	25.7	32.4	A	9.5	21	42.0	2.0	
8.8		42.7	56.9		9.1	26	10.1	34.4		9.3		50.2	37.3		9.4	20	4.2	40.2		9.5	23	25.2	6.2	
8.8		44.5	46.1		9.0		38.9	44.6	B	9.5	21	39.6	25.4		9.0		28.4	41.7	B	9.4		25.4	39.2	B
9.5		49.3	30.3		9.3	27	47.8	44.3		9.5	25	8.4	11.3		9.4	21	56.3	29.4		9.3	25	22.0	15.0	A
9.5	29	28.1	30.8		8.7		50.4	3.8	A	9.4	26	20.0	14.1		9.5	24	27.2	3.0		9.4	28	39.1	58.2	
9.5	31	48.0	15.9		9.2		54.0	45.5	B	9.1		28.9	46.1	A	9.3		30.4	22.5		9.4	29	6.1	21.4	
8.5	32	53.0	4.0	A	9.1	28	21.7	20.4	B	9.1		37.0	40.8	A	9.1	25	12.7	36.2		9.0		51.3	6.6	
9.3	34	0.4	43.0	A	9.4		31.4	13.9		8.5	27	34.7	4.4	A	8.6	26	28.6	57.9	A	9.2	31	48.9	42.5	
7.9		17.5	44.1	A	8.6		51.4	31.1	A	9.4	28	4.9	32.5	B	9.5	28	27.6	7.9		9.1	32	35.2	57.8	
9.5	35	19.0	58.3		9.3	30	1.9	30.6	A	9.3		10.3	36.4		9.2	30	17.7	38.8		9.5		49.6	33.2	
9.1		29.1	13.3	A	8.5	31	13.2	9.1	A	8.9		16.5	37.8	A	9.5		37.8	12.6		8.8	33	47.4	50.6	B
9.5	37	24.9	57.6		9.5		55.9	2.8		9.0		17.8	52.5	B	9.2		49.3	26.4	A	8.7	34	16.6	34.2	A
8.9	38	26.0	10.1	A	9.3		56.2	29.6		8.8	29	8.7	16.9		9.1	31	15.2	58.8		8.7	35	50.5	50.9	A
9.3	39	26.4	7.8	R	9.5	34	20.4	46.8		8.8		58.0	9.2	A	6.3	32	30.1	46.5	A	8.5		59.7	48.3	A
8.0	40	6.5	54.2	B	9.5		39.1	10.2		8.8	30	0.6	7.3	A	9.3	37	14.2	36.3		9.0	37	10.5	47.4	A
7.6		11.1	3.7	A	9.0	36	31.0	47.3		9.4		9.4	51.9	B	7.8	38	5.5	50.0	B	9.4		37.1	52.8	A
7.8		32.2	40.6	L	9.5	38	2.3	56.6		9.3	31	38.0	43.1		9.0		24.3	48.5	A	8.0	39	45.6	28.[illegible]	
9.5	42	48.3	38.7		9.2	39	12.9	32.6		9.2	32	7.4	10.1	B	9.3	39	29.5	39.7		8.4	41	17.5	[illegible]	
8.9	43	10.1	25.1	A	9.0	40	32.3	52.6	A	8.8	33	32.8	42.1	A	8.4		34.1	45.0	A	9.4		52.0		
8.7		21.2	41.9	A	9.5	42	19.1	25.1		9.5		42.7	52.1	B	9.5	41	7.6	6.7	B	8.0	44	59.[illegible]		
9.2	44	4.2	37.0		9.3		21.4	35.6	B	8.5		49.5	42.6	A	9.0	43	8.1	28.3	A	7.7	45	[illegible]		
7.0	46	10.1	45.8	A	8.3	43	20.0	41.9	A	9.4	34	24.7	38.3		9.2		11.6	57.2	A	9.3	46			
9.5		16.0	14.8		7.4		43.5	21.6	A	9.0	35	44.5	41.2	A	7.8		42.1	26.9	A	9.5	47			

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	12h—13h		+58°		13h—14h		+58°		14h—15h		+58°		15h—16h		+58°		16h—17h		+58°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.3	47	18.1	55.3	9.3	34	40.5	4.6	B	8.6	36	30.2	58.9	A	9.2	34	57.2	21.7		7.8	25	53.4	33.2	A
8.0	48	44.6	56.3	S	9.0	36	42.7	36.8		9.0		36.6	50.5	A	9.5	35	17.3	38.5		9.3	27	52.6	11.8	B
9.1	49	0.5	57.2		9.3	38	35.4	35.6		6.8		52.6	33.8	A	6.3		55.7	22.7	G	9.4	28	27.3	14.2	
8.5	50	10.3	23.3	A	9.3		54.5	38.1	B	9.4	38	57.2	38.7		9.5	36	38.2	54.8		9.0		31.7	13.1	B
8.6		37.6	30.8	A	9.5	39	37.2	31.4		9.3	40	0.2	42.9	B	9.5		43.5	33.5		8.1		40.6	9.1	A
9.5		43.4	8.2		8.5		48.8	36.8	A	9.0		55.6	25.0		9.5	38	15.7	36.6		8.0		56.4	4.4	A
7.8	51	3.5	28.7	A	9.0	40	28.2	42.5	A	9.5	41	27.2	14.1		9.3	40	28.7	28.7		9.2	29	18.5	49.8	
9.5	53	1.2	18.5		9.5		42.3	29.9		9.1	43	35.2	25.5		8.9		39.8	28.9	B	9.1	31	3.0	43.0	
9.5	55	6.5	8.7		9.3	43	56.2	58.9	A	8.0	44	23.1	40.2	A	9.5		42.5	21.3		8.8	32	27.9	39.2	B
8.1		34.1	24.6	B	9.5	44	18.2	51.4		9.4		46.7	36.3		9.3		54.9	31.1		7.5	33	4.3	4.3	L
8.9	57	10.7	6.0	A	9.3	47	1.2	58.8	A	8.0	46	2.6	29.9	A	7.1	41	41.2	53.2	B	9.3		5.0	14.0	
9.5		58.2	33.7		9.4		49.7	59.3	A	8.8		34.1	42.6	A	9.4	44	9.7	10.2	B	9.4		46.1	58.2	
9.3	59	38.0	1.7	B	9.2	48	6.3	40.7	A	8.0		49.9	0.4	B	9.5	46	7.0	53.0		8.7	35	15.0	6.7	
9.2	0	29.0	30.4	B	8.5		14.8	37.3	A	9.4	47	24.6	49.0		9.1	47	21.0	16.3		8.6		27.1	29.8	
9.5	1	41.7	24.8		9.5	50	4.2	52.4		9.3	49	6.1	45.3	A	9.4		36.6	5.5		9.0		53.6	37.2	
9.2	2	13.6	24.3	A	9.1		45.3	27.4	A	9.4		21.2	26.7		9.2	49	2.1	8.9	A	9.5	36	0.0	56.7	
9.0	3	20.6	29.2	A	9.5	51	58.5	38.8		8.7		37.6	47.7	A	9.1	50	12.8	22.6	A	9.4		38.4	4.1	
9.4		42.0	23.0		9.1	52	43.1	3.4		9.3		58.2	9.5		8.8	51	40.7	31.5		9.5	37	1.6	0.7	
9.5		44.2	7.2		9.0		50.9	9.7		7.0	53	30.9	13.4	A	9.4	52	37.4	18.8	B	8.6		13.6	1.1	B
9.3		56.5	24.4	B	9.5	53	7.6	26.1	B	9.5	54	23.1	23.7		9.2		54.0	33.6	B	9.3		14.0	2.2	
8.9		59.6	20.4	A	9.5	56	44.7	31.5		8.4		50.6	51.2	A	9.4	54	25.5	59.2		8.0		35.6	24.0	B
8.0	4	11.7	48.5	A	9.0	57	46.9	42.6		9.0	56	41.8	7.6		9.5	55	9.0	14.5		9.5		55.2	20.4	
8.3		23.7	11.6	A	9.5		47.6	11.1		9.5		54.8	51.8		9.5		10.2	17.5		9.0	38	36.6	22.3	
7.8		55.1	19.9	A	9.5	58	32.9	38.3		8.3	57	8.2	19.3	A	9.2		41.0	10.5		9.0	40	29.0	9.1	
9.2	5	15.0	17.1	B	9.0	59	31.4	41.7		9.5		23.9	39.5		9.5	56	21.0	12.5		9.0		45.3	48.4	
9.5		22.2	23.3		9.3	2	27.3	10.1		9.1	59	19.2	49.3		9.4	57	52.8	7.0	B	9.1	42	43.5	7.8	B
9.5		38.5	22.3		9.1	4	25.1	4.9	A	9.0		30.7	45.4		9.5	58	19.3	20.7		8.7		46.7	21.0	A
9.3	7	0.1	36.9	B	9.5	8	44.4	53.6		9.5	0	21.2	34.0		3.5	59	11.5	56.8	A	9.4	43	3.8	49.2	
9.4	9	17.2	35.0		7.4	9	8.6	47.6	B	9.5	1	53.6	43.4		9.2	0	13.0	50.3		8.1		13.8	55.2	P
8.3	10	2.1	42.1	A	9.5	10	50.7	51.4		8.0	2	23.1	17.9	A	9.3	2	19.4	47.5		8.9	44	0.2	39.3	A
8.3		25.2	57.8	A	7.8	11	55.3	45.1	A	9.4		55.2	41.5		8.0		30.7	33.4	B	9.5		17.0	3.5	
9.4		46.7	9.6		9.5	12	49.2	15.1		7.5	4	34.1	12.4	A	9.4		32.2	31.9		8.0	45	46.2	4.8	L
8.8	11	10.1	39.6	A	9.1	14	49.6	2.8		9.5	5	43.2	29.7		9.5		33.5	30.4	B	9.0	47	12.8	31.3	A
8.5		14.2	2.7		8.9		57.1	4.3	B	9.5	6	19.1	56.7		9.4		33.5	31.0		9.5	48	50.1	3.4	
9.5		36.8	57.7	B	9.5	16	4.7	14.2		9.5	7	0.7	26.2		8.5		35.9	17.0		9.4	49	4.6	35.8	A
9.5		44.8	26.1		8.2	17	32.3	17.1	A	9.5	8	32.1	28.7		9.0	3	49.5	4.3		9.5		59.2	39.3	
7.4		45.5	35.3	B	9.0	18	2.9	20.9	A	9.0	10	1.2	48.3		9.5	5	22.1	18.0		9.3	50	9.8	12.2	
9.1	13	42.2	3.3		9.4	19	4.9	57.4		9.3	12	40.9	22.7		9.5		26.7	55.4	B	9.0		20.2	0.9	A
9.3	17	22.0	2.3		9.5	20	9.0	9.8		8.5	13	19.7	22.7		9.5		27.1	50.3		9.5	51	57.7	17.2	A
9.3		37.6	27.8		8.8		31.2	31.3	A	9.5		22.3	17.9		9.5		30.6	55.7		9.5		57.7	5.1	
9.1		44.5	39.1	A	9.1		43.3	17.6		9.1		54.8	29.7		9.1	6	11.1	24.3	B	9.4	52	19.8	14.2	A
9.1		47.5	2.5	B	9.5	22	33.7	49.0		9.2	14	40.7	42.9		6.7		13.8	19.4	J	9.4	53	8.5	46.7	
9.0	18	11.6	36.6	A	7.3	23	24.8	58.4	A	8.2	15	25.2	38.6	A	9.5	8	1.6	59.6		8.5	54	36.1	9.6	A
8.7	19	5.4	5.8		9.4	24	17.3	24.1	B	9.5		51.1	36.6	B	9.4		22.0	19.9		9.1		41.2	9.1	A
9.3	20	38.2	56.8		9.4		25.2	7.3		9.2	16	50.4	56.7		8.3	9	46.7	9.6		9.0	56	17.4	7.6	
9.4	21	2.8	39.3		9.4	26	23.0	35.6	B	9.3	17	44.7	46.4		8.5	12	12.0	15.0		9.5	57	8.9	35.7	
9.3		26.6	51.9	A	9.4		36.3	49.1		9.1	19	30.3	47.3	B	9.5		21.3	12.5		9.0		9.4	59.7	
8.7		52.2	38.5	B	8.7		52.5	39.0	B	8.3	21	15.4	14.4		7.8	13	14.0	50.3	F	8.0		26.6	48.4	B
7.5	20	34.1	57.7	A	9.2	27	8.6	11.7	B	9.5		16.0	6.0		9.4	14	22.7	1.2		6.3		31.1	40.2	P
8.9	23	10.4	5.4	A	8.8		39.2	35.3		9.5		27.4	55.7		9.1	15	6.5	21.8		9.5		57.6	10.6	
8.5	25	33.5	35.2	A	9.5	29	47.6	32.3		9.5	24	16.1	56.2		9.1		24.0	47.6		9.0	58	19.2	51.8	A
9.2	26	1.1	5.9	B	9.0	30	26.9	34.3	A	9.4		35.2	32.5		9.5	16	1.4	56.2		9.1		59.8	46.6	A
9.1		3.4	9.9	B	9.5	31	23.8	3.9		9.3	25	35.3	49.3		9.5		45.5	48.5		7.0	59	13.9	45.9	B
9.5	27	14.3	48.8		7.8	32	7.1	11.4	A	8.8	29	1.6	27.7	A	9.5	17	7.5	31.6		9.5		14.7	58.2	
8.0	28	51.6	15.9	A	9.3	33	36.7	43.6	A	9.3		36.7	50.2	A	9.0	21	5.7	2.2	A	9.5	0	22.7	7.6	
9.5	32	17.3	37.4		9.5		48.0	5.4		9.3		45.5	51.7		9.2		24.7	56.3		9.5	2	4.4	28.3	
9.5		24.7	34.1		9.4	34	2.1	12.2		9.0	31	41.7	50.2	A	9.1	22	6.4	36.1	A	9.0	3	12.7	54.2	B
9.5	33	21.7	33.8		9.5		6.5	16.2		9.5	32	31.9	6.9		9.3		51.2	46.4	A	6.7	4	53.2	27.3	J
8.5		43.8	45.9	B	9.4	35	27.9	24.8	B	9.4	33	17.3	13.1	B	9.5	23	24.6	25.9		9.5	5	13.5	28.3	
9.5	34	31.9	15.4	B	7.3	36	2.6	19.9	L	9.4		49.1	52.9	B	7.5	24	21.0	33.2	A	9.5	6	28.7	17.0	

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	17ᵘ	+58°			17ᵘ—18ᵘ	+58°			18ᵘ—19ᵘ	+58°			19ᵘ	+58°			19ᵘ	+58°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	7 18.8	17.0		9.3	45 40.1	3.5		9.0	27 54.5	7.1		9.5	9 47.3	29.9		9.0	32 46.5	26.5	
9.5	22.1	46.0		8.3	46 15.0	35.1	A	9.3	29 59.6	2.0		9.5	54.7	8.6		9.1	33 8.4	39.6	
9.5	8 2.7	26.3		9.5	40.6	8.9		9.5	31 10.9	39.6		9.5	10 53.1	19.0		8.8	33.1	31.1	
9.4	35.4	40.9	A	9.3	47 9.9	35.9		9.1	13.3	35.2		9.5	11 10.2	30.9		9.5	34 28.1	10.6	
9.5	37.8	56.2		9.3	19.2	20.6		9.0	34 58.8	25.9		9.1	28.5	9.2		9.5	32.6	10.2	
9.0	59.0	4.0		9.5	48 0.0	58.5		8.8	35 45.4	16.6		9.5	12 31.4	56.0		9.5	37.6	10.8	
7.0	9 33.4	8.3	B	8.7	12.7	20.5	A	8.2	37 36.4	6.3	A	9.5	13 35.4	31.0		9.4	35 13.6	45.8	
9.2	10 16.6	48.4	A	9.5	51.6	0.4		9.5	38 13.7	28.9		9.1	14 40.5	53.7		8.3	25.4	11.7	A
9.3	24.8	41.8	B	9.5	49 50.7	50.0		9.5	40 47.8	24.4		9.2	52.0	58.7		9.1	27.3	10.3	A
9.2	28.7	2.0	A	9.4	50 20.3	12.7	A	9.4	43 24.0	11.2		9.1	15 0.2	18.1		9.4	30.5	51.9	
8.3	11 14.1	40.6	A	9.5	52 14.5	9.3		9.2	35.0	10.3	A	8.5	20.5	28.8	R	9.0	30.8	48.6	A
9.5	25.2	20.6		8.5	57.5	46.2		9.3	40.2	11.4	A	9.2	53.6	39.2		9.3	37.7	0.1	B
7.9	12 27.2	32.7	B	9.4	54 57.9	7.4	A	9.2	44 19.0	26.4		9.5	16 4.9	21.0		9.4	47.1	31.3	
9.5	45.9	16.3		9.3	56 0.0	29.0	A	9.3	45 16.3	48.0		9.4	5.7	9.8		9.5	37 10.0	15.3	
9.5	13 58.4	46.7		9.5	25.7	28.5		9.5	46 44.0	20.4		9.5	17 4.8	25.8		9.2	29.0	1.9	
9.1	15 23.4	4.7	B	7.8	57 7.0	46.6	A	9.5	47 3.1	1.3		9.5	12.3	45.1		9.5	32.1	32.5	
9.5	32.7	56.0		9.5	58 29.4	17.2		8.9	16.3	32.1		9.0	48.6	34.3		9.3	38.4	37.5	
8.7	16 15.1	30.4	A	9.4	41.0	32.4		9.5	20.4	7.3		9.4	18 29.7	37.9		9.5	45.6	26.5	
9.3	17 4.2	8.9	A	9.2	42.6	54.0		9.4	32.7	16.1		9.4	41.5	21.3		9.5	56.8	36.0	
8.7	16.5	39.8	A	9.3	0 0.7	50.0	A	9.0	50 25.8	31.7		9.2	20 3.1	14.9		9.5	39 16.0	28.1	
8.7	18 1.8	7.9	A	6.5	24.0	37.8	A	9.0	27.3	46.6		9.5	33.0	47.0		9.0	19.6	42.7	
9.5	3.9	1.5		9.0	1 44.1	19.6	A	9.1	49.4	4.4		9.4	21 14.5	42.3		8.7	29.5	50.0	
9.5	19 56.7	20.4		8.9	48.0	43.9	A	9.3	49.8	16.6		9.5	49.5	12.6		9.5	49.3	36.4	
8.5	20 22.3	13.7		9.3	2 11.0	52.9	A	7.8	52 13.8	32.2		9.5	59.5	19.0		9.0	40 3.2	53.3	
9.2	31.0	34.3	B	9.3	22.9	23.1	B	9.2	17.0	19.9		9.5	22 2.2	31.4		9.5	30.7	5.5	
8.8	22 0.3	49.6		9.5	4 3.0	39.6		9.4	27.1	46.5		9.5	26.9	5.4		9.5	41 6.9	31.8	
9.5	5.0	21.5		9.3	25.8	11.2	A	9.4	56.3	25.7		9.3	49.7	42.5		9.0	22.8	44.5	
9.4	7.2	12.0		9.5	58.5	3.9		9.5	53 59.8	45.0		9.5	23 32.5	13.0	B	9.1	23.9	0.3	B
9.5	48.7	55.0		7.5	5 33.0	58.3	L	6.6	55 6.2	1.2	S	9.5	59.3	28.2		8.6	40.3	9.6	A
8.8	23 33.2	9.4		9.4	36.5	4.0		9.5	56 11.2	9.5		9.2	24 1.9	2.5		9.1	41.0	17.5	
6.0	55.1	47.7	A	7.5	53.5	59.8	L	8.6	57 9.6	24.5		9.5	5.7	20.4		9.4	41.6	1.5	
9.1	25 1.8	20.1	A	9.3	6 18.8	25.5	B	9.5	18.5	41.6		9.2	21.5	34.0		8.9	46.4	24.6	
9.3	28 19.7	35.4	A	9.5	39.7	28.0		9.5	22.9	2.5		9.5	21.5	39.4		9.3	46.5	41.0	
9.3	39.6	28.5	A	9.5	7 1.9	38.8		9.5	30.2	47.0		8.5	21.9	45.1	B	9.5	51.3	11.0	
9.5	29 22.7	19.7		9.5	8 34.8	57.5		9.5	58 9.1	53.3		9.3	38.5	17.1		9.4	42 14.1	54.8	
9.4	39.5	56.9	B	9.5	9 30.6	51.8		9.5	14.6	3.0		9.1	53.9	42.0	A	9.5	29.8	47.0	
9.5	48.5	56.4		9.3	10 53.8	40.8	B	9.5	35.7	27.5		8.4	57.1	19.3	R	9.5	43 6.0	19.9	
9.3	30 18.8	32.9	A	9.5	12 8.0	20.0		9.5	59 52.7	25.0		9.3	25 0.2	43.6	A	8.8	10.9	25.7	
8.5	31 41.0	52.0		8.8	13 26.4	45.1	A	9.5	57.2	56.2		9.0	26 7.5	10.4		9.1	17.8	39.4	
9.3	52.7	34.5	B	9.4	15 9.4	57.3	A	9.5	0 38.4	53.3		8.9	12.0	58.7	A	8.4	24.9	47.5	
9.0	32 28.3	40.7		9.0	51.3	1.2	A	9.5	58.5	0.5		8.6	15.8	49.2	A	7.8	28.8	0.6	B
9.5	34 22.7	52.0		9.0	17 27.5	28.1	A	9.3	1 30.6	56.6		9.5	21.6	22.3		8.7	29.7	58.3	
9.5	35 37.1	5.2		9.3	31.3	23.4	A	9.5	43.9	25.5		9.2	28.7	30.5		9.4	36.3	15.3	
9.0	37 11.2	19.8		9.5	38.5	32.8		9.5	2 10.0	57.0		9.5	56.6	33.6		9.2	39.0	52.2	
8.3	26.7	53.0	L	8.0	18 31.5	36.4	A	9.1	49.4	30.5		8.3	27 19.1	18.1	F	9.3	46.8	23.5	
8.0	35.8	46.2	L	8.7	19 22.0	46.5	A	9.4	3 8.2	29.0		9.5	21.0	26.1		9.4	44 39.5	40.7	
9.3	48.4	14.8		9.5	36.2	19.4		8.5	41.9	21.5		9.4	28 7.7	21.2		9.5	40.0	27.1	
9.3	40 18.6	30.0		9.3	20 41.8	25.4		9.5	4 17.5	49.6		8.5	8.2	32.7		9.0	45 23.3	36.1	
8.1	43.5	44.2	A	4.8	21 48.6	44.6	A	9.4	5 9.6	58.2		6.4	43.3	17.6	B	8.9	46 21.7	54.8	
9.1	41 9.0	56.4	A	9.0	53.3	46.5	A	9.5	6 27.5	2.2		9.4	49.5	6.5		9.4	40.0	3.9	
9.4	58.5	55.9	B	9.2	22 9.3	29.7	A	9.5	35.7	42.9		9.5	29 18.7	4.1		9.4	40.0	42.8	
9.5	42 26.2	19.8		9.5	16.4	8.8		7.0	7 10.5	2.3	A	9.5	25.8	42.9		9.2	46.0		
9.5	43 47.0	52.0		9.2	30.5	32.9	A	6.9	19.2	13.6	A	9.5	30.0	47.7		9.4	52.		
9.5	44 2.2	6.3		9.5	37.1	3.4		9.5	46.3	28.0		9.4	53.7	36.4		8.5	48		
8.2	43.5	41.3	B	9.0	42.7	28.9	A	9.5	8 5.8	39.2		9.4	30 36.0	56.8		8.5			
9.3	49.4	36.8		9.4	50.7	4.0	B	8.9	7.4	29.6		9.1	39.3	47.2		9.0			
9.5	53.2	53.7		9.0	24 46.7	11.6	A	9.5	15.0	56.8		9.2	31 14.6	15.6		8.			
9.2	45 1.8	51.6		9.3	25 24.5	23.9	A	8.0	53.2	4.7	A	9.3	36.7	37.4					
9.5	8.4	54.2		8.7	57.3	27.9	A	9.5	9 4.0	13.7	A	9.2	32 16.9	18.6					
9.3	27.0	57.9		9.5	27 44.9	0.0		7.8	5.2	17.2	A	9.2	39.7	2.6					

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	19ʰ—20ʰ	+58°			20ʰ	+58°			20ʰ	+58°			20ʰ—21ʰ	+58°			21ʰ	+58°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	49 13.0	23.0		9.2	6 17.0	17.0		9.4	24 11.1	44.6		9.2	47 31.8	27.9		9.0	11 5.6	5.9	A
9.3	41.7	39.3		9.5	58.4	30.3		9.5	17.5	10.3		8.8	48 43.9	30.8		9.4	24.7	13.7	
9.4	42.0	52.9		9.5	7 10.4	2.5		9.5	30.9	14.4		7.0	54.8	6.3	A	9.2	30.1	16.3	
8.5	54.1	15.8	B	9.2	17.0	36.9		9.5	50.8	7.9		9.0	49 10.0	18.9		9.2	12 38.6	9.4	
9.5	50 3.3	9.7		9.1	20.8	12.6		9.5	54.1	4.9		8.4	32.8	37.8	A	9.5	45.9	35.1	
9.3	39.6	43.0		9.4	31.4	22.5		9.5	25 24.1	14.4		9.5	50.0	55.7		9.3	13 10.3	43.3	B
8.5	55.0	28.5		9.1	38.6	37.7	A	9.4	26.3	12.6	B	6.6	50 12.5	45.7	A	9.3	28.6	34.2	
8.7	51 31.1	6.3		8.9	54.8	35.6	B	9.1	49.3	58.0		9.4	20.0	19.8	R	8.0	14 52.6	18.8	A
9.2	59.4	4.0		9.3	8 32.4	4.4		9.5	54.5	4.9		9.0	52.2	35.7	A	5.6	15 16.1	0.7	A
8.4	52 19.0	52.3		9.4	41.1	27.0		8.2	27 6.3	21.9		9.4	52 14.3	15.4	B	7.8	29.5	17.2	A
9.5	27.2	32.0		8.8	9 17.3	41.5	A	9.5	30.5	47.4		8.4	23.5	34.1	A	9.5	40.6	18.8	
9.5	32.3	34.8		8.4	19.3	59.7		9.5	37.9	6.5		9.0	53 19.1	17.2	A	9.1	56.8	5.0	
5.1	53 9.0	27.7	G	9.5	27.8	19.6		9.5	28 54.0	4.0		7.8	36.1	15.7	A	8.5	16 54.6	30.6	A
8.9	53.3	59.3		9.5	54.0	35.2		8.5	29 10.8	19.2		9.0	54 1.0	14.8	B	9.5	17 4.3	1.9	
9.5	57.8	47.0		8.8	10 59.8	17.4		8.6	42.3	53.6	A	7.5	3.2	15.7	A	8.1	12.0	25.8	A
9.5	54 18.3	25.5		9.5	11 18.9	15.4		8.0	30 20.8	59.6	A	9.1	23.6	46.1		9.5	40.6	9.8	
8.9	22.4	12.7		9.5	32.4	43.0		9.5	31 40.9	16.4		8.0	43.6	22.7	A	9.3	18 53.2	30.2	
8.7	24.5	15.2		7.0	40.5	29.8	F	9.5	32 33.5	30.8		9.3	58.8	24.8	B	9.0	19 9.1	20.8	
9.5	30.1	6.8		9.4	12 7.6	16.9		7.8	33 1.7	42.5	B	9.5	55 13.1	5.4		9.4	30.3	45.1	
9.4	36.1	54.1		9.4	13.2	8.3		9.0	20.0	10.6		9.0	14.2	35.1		9.4	53.9	24.1	
9.1	55 0.2	7.5		9.5	21.2	31.6		8.2	21.0	37.1	B	5.6	53.0	52.2	A	8.3	20 18.1	58.5	A
9.1	58.4	37.1		9.4	27.5	4.2		8.0	38.3	54.1	R	9.4	56 6.6	29.7		8.9	28.0	57.6	A
9.5	56 18.7	22.5		9.1	13 23.9	2.8	A	9.5	50.3	16.0	B	9.3	20.2	39.6		7.9	21 59.0	4.7	B
9.1	28.2	57.1	S	9.4	14 19.6	43.3		7.8	34 8.3	20.4	A	8.7	39.5	51.2	A	9.5	22 13.1	39.6	
8.7	32.3	9.4		9.1	59.8	47.4		7.5	14.6	30.3	A	8.0	54.5	2.2	A	9.3	37.6	29.2	
9.5	54.6	17.0		7.5	15 11.7	21.5	A	9.2	26.3	30.3		9.4	59.1	34.3	B	9.5	41.6	24.2	
9.4	58.5	14.3		9.5	24.9	41.5		9.2	59.4	36.3		9.4	57 18.4	0.5		9.1	23 4.4	59.2	
9.5	57 24.5	40.2		9.2	40.1	46.5		7.8	35 0.5	27.8	A	9.3	19.4	55.0	B	9.0	27.8	39.6	
9.5	47.2	43.9		9.5	16 4.2	10.1		8.4	32.8	30.8	A	9.4	19.8	56.3		9.4	32.3	4.6	
9.5	47.2	57.8		9.4	50.0	12.0		9.3	44.3	41.8		9.3	21.5	49.9		9.5	59.0	37.9	
9.5	58 23.0	28.1		9.4	17 28.8	25.6		9.5	36 11.9	5.9		9.5	40.8	0.2		9.5	24 35.5	21.2	
9.0	27.3	11.1		9.5	36.0	31.3		8.9	20.1	43.9		9.2	50.6	10.8		7.8	47.6	6.4	B
9.4	57.7	46.0		8.5	44.7	51.9	A	9.3	20.6	35.9	B	9.5	58 19.1	19.8		9.2	25 44.0	18.2	
9.5	59 16.9	5.4		9.5	18 46.3	37.8		8.9	25.3	46.3		9.4	25.2	30.1		9.3	48.9	18.2	
9.5	36.0	28.0		9.5	57.2	56.3		9.5	32.5	14.4		8.6	45.1	45.2	A	9.5	26 9.5	55.7	
9.1	37.1	6.1		9.5	19 7.5	55.9		8.4	37.9	22.4	A	9.0	59 26.6	31.2		9.3	20.0	43.9	B
9.5	58.3	36.4		9.5	25.9	55.8		9.1	53.2	55.6		9.2	52.7	50.2		8.5	22.8	31.5	A
9.5	0 17.3	12.5		9.2	34.1	4.3		9.0	37 15.8	27.9		8.5	0 15.1	57.1	A	9.5	26.2	0.3	B
9.5	20.7	56.0		9.5	34.5	25.8		9.5	38 17.8	2.5		9.5	17.4	53.4	B	6.8	51.0	45.5	A
8.8	21.1	19.0	B	9.2	51.0	12.8		8.5	19.2	40.7	A	9.1	46.1	29.7		9.5	27 21.7	5.8	B
9.3	22.8	21.7		9.5	20 11.5	1.9		9.1	41.9	49.0	A	9.5	1 14.1	20.2	R	9.5	30.6	2.4	
9.2	30.4	59.2		9.5	12.7	20.0		8.5	39 5.3	11.4	A	9.5	43.6	20.2		8.0	28 15.0	55.4	A
9.5	59.4	38.3		8.6	19.2	1.7		9.3	34.8	23.9		9.4	2 8.9	21.5	B	8.0	33.9	0.9	A
9.0	1 8.2	45.9		9.5	53.1	26.1		9.3	38.6	18.9		9.5	10.3	17.6		9.4	40.8	14.1	
9.1	10.5	14.8		9.5	21 11.5	7.9		8.8	41 2.9	30.8	A	9.2	10.6	39.2		9.5	29 15.0	23.5	
8.2	31.0	25.3	B	9.5	34.8	2.7		9.1	44.8	23.9		7.3	45.8	50.1	A	9.5	19.0	17.4	
9.5	57.4	45.0		9.4	44.0	22.0		9.2	49.3	18.4		7.7	3 13.7	24.8	A	9.5	22.4	14.1	
9.5	59.7	30.4		8.2	52.6	41.7		8.8	57.7	40.3	A	9.2	4 12.7	2.9		8.0	46.5	48.5	A
9.3	2 31.6	41.3	B	8.8	56.2	48.9		9.4	42 4.9	34.3		9.4	13.0	16.8		9.0	30 13.0	49.1	A
9.5	32.3	52.2		9.4	22 6.6	17.8		8.5	54.3	25.4	G	8.8	24.1	31.7	A	8.5	17.7	22.7	A
9.2	34.5	31.0		9.5	30.0	15.1		9.1	43 28.8	8.3		8.5	6 27.6	19.3		8.0	22.0	27.6	A
9.2	35.0	25.4		8.7	31.9	50.4		9.3	32.6	34.2	B	9.0	32.1	59.5		9.2	25.1	0.4	
9.5	36.8	37.5		9.4	38.1	8.0	B	9.4	44 22.8	38.1		9.4	7 25.9	32.2		9.5	43.8	47.5	
9.5	3 33.3	1.8		9.5	23 7.5	52.0		9.0	45 0.2	2.0		8.9	39.6	31.7		9.4	31 5.7	6.5	
9.2	50.0	55.8		8.5	7.9	40.6		9.5	33.3	28.4		8.8	8 10.5	5.5		8.0	32 13.8	3.8	A
9.5	4 22.2	59.5		8.3	27.3	52.9		7.8	34.5	10.9	A	9.0	18.4	17.9	B	9.3	21.3	24.2	
9.5	22.3	19.0	B	9.5	28.6	18.3		9.5	34.7	2.4		8.0	19.4	18.5	B	9.5	51.9	2.5	
8.5	50.1	43.1		9.5	35.0	31.6		6.5	49.3	12.4	A	9.3	44.0	28.3	B	8.9	33 2.7	20.1	
7.7	5 29.6	21.8	B	9.1	43.6	3.1		9.2	46 1.2	54.6		8.3	9 26.5	1.5	A	9.5	4.0	42.5	
9.5	6 15.2	19.1		9.5	24 5.9	34.7		8.6	47 23.8	44.8	A	9.0	27.7	22.1	A	7.7	20.3	7.5	

2301—2360			
	21ʰ	+58°	
m	′ ″	′	
8.5	33 23.6	48.5	A
9.0	55.5	31.0	
9.2	34 46.4	53.1	
9.0	58.5	43.5	
9.5	35 13.0	18.6	
9.5	28.9	58.4	
9.5	35.5	6.7	
9.5	36 28.9	34.7	
9.5	54.0	27.6	
9.5	55.0	32.6	
9.4	37 48.6	45.0	
9.5	38 5.5	9.7	A
9.0	10.8	10.7	A
6.7	26.0	36.5	A
9.2	56.7	11.0	
var	39 6.6	7.0	A
9.5	15.4	54.1	
9.0	21.0	18.7	A
9.3	37.6	7.5	B
9.0	40 9.0	23.8	A
9.5	25.3	56.8	
9.1	52.7	19.3	A
9.4	41 23.3	56.4	
8.8	36.0	51.4	A
9.5	50.5	43.7	
9.3	42 16.3	29.1	
9.2	43 13.5	40.0	
9.3	42.0	18.6	B
9.5	44 9.4	18.5	B
9.5	22.0	20.1	
9.5	45 16.6	43.0	
9.4	20.9	9.1	B
9.1	21.8	32.5	
9.4	46 2.5	28.2	
9.4	9.3	10.8	
9.4	10.2	14.8	B
9.2	28.0	35.9	
9.2	47 8.1	1.7	
9.5	17.2	52.2	
9.0	22.3	25.7	
9.5	26.5	12.7	
8.8	41.8	28.6	
9.0	56.5	46.6	
9.1	48 3.2	35.5	
9.4	5.7	24.0	
9.5	18.5	52.9	
9.5	49 2.0	57.8	
9.4	29.0	50.0	
8.5	42.0	45.0	A
9.0	50 7.7	51.4	A
9.3	16.2	19.7	
9.4	17.3	6.5	
9.3	55.7	46.5	B
8.8	51 13.6	16.1	
9.3	30.0	49.0	
8.2	52 6.3	57.1	A
9.3	24.5	45.0	
9.2	26.3	38.6	
9.3	33.0	57.6	A
9.4	43.6	52.2	

2361—2420			
	21ʰ—22ʰ	+58°	
m	′ ″	′	
8.9	52 49.7	1.5	
8.9	50.6	4.8	
8.2	59.0	25.5	A
9.3	53 42.3	44.0	
9.2	43.0	31.5	
8.9	54 1.5	24.1	
8.9	19.6	48.6	
9.2	41.2	45.5	
9.2	51.4	41.0	B
9.4	55 0.0	53.8	
8.5	11.0	15.6	
9.4	30.1	54.6	
9.1	56 37.3	47.9	
9.0	57 1.8	10.6	
9.0	9.1	49.8	A
8.6	32.3	58.4	A
9.5	46.2	50.5	
9.5	48.3	34.0	
9.3	53.4	43.0	
7.8	58 54.8	27.9	B
7.3	59 29.7	5.2	A
9.4	57.9	45.7	
9.5	0 25.4	1.1	
8.9	28.9	51.8	
8.7	48.3	10.2	A
9.4	54.0	24.3	
9.2	55.6	3.3	
9.4	58.7	57.1	
9.4	1 10.7	5.9	
9.4	30.0	11.8	A
8.8	39.5	38.6	
8.5	54.0	6.7	A
6.7	2 16.5	7.5	A
9.5	3 19.8	9.3	
6.5	46.0	35.0	A
9.1	47.9	50.5	
8.0	4 6.0	8.8	A
9.5	5 1.3	52.6	
8.2	16.5	30.6	A
9.5	33.2	22.1	
9.4	55.2	27.7	
5.6	6 37.7	41.8	G
6.3	59.0	20.8	A
9.5	7 8.2	53.8	
9.2	12.2	19.2	
9.2	12.8	25.6	A
9.5	46.0	24.5	A
9.0	8 3.5	37.5	A
7.5	10.7	35.3	A
9.5	9 11.3	2.0	
9.2	32.5	42.8	
9.2	58.9	2.5	
7.5	10 4.2	23.0	G
9.5	11 15.4	28.0	
9.5	26.0	26.5	
8.2	31.0	16.3	G
8.7	12 31.3	38.4	A
9.5	58.1	0.4	
9.2	13 26.5	20.2	A
	[illegible] 8	56.0	

2421—2480			
	22ʰ	+58°	
m	′ ″	′	
8.5	14 15.0	13.5	A
9.5	28.0	10.0	A
9.5	43.2	13.0	
9.5	52.5	16.9	
9.5	15 32.3	3.5	
9.5	16 20.7	56.3	
9.5	18 30.0	6.5	
7.8	48.6	59.6	A
9.3	59.1	25.0	
9.5	19 59.5	41.8	
8.1	20 51.6	31.3	A
9.5	58.3	49.9	
9.5	21 29.5	58.8	
8.5	59.3	12.9	A
9.5	22 15.6	6.8	
8.7	15.8	26.4	
9.5	52.2	8.9	
8.5	55.3	12.9	A
9.0	23 14.3	42.1	
8.0	20.1	6.7	A
9.5	24 34.9	48.4	
9.1	35.9	54.0	A
9.2	40.3	26.0	
8.7	46.4	31.0	
8.4	48.3	55.6	A
9.0	25 9.2	35.8	
9.5	18.5	15.4	
9.5	18.9	2.1	
8.0	26 51.6	45.0	B
8.0	27 4.2	16.8	A
9.4	29.4	21.1	
9.5	40.5	26.7	
8.8	47.2	42.9	
9.1	55.9	4.9	
8.8	29 21.3	4.1	
9.0	30 13.7	7.0	
9.5	36.6	7.0	
8.0	31 14.6	50.9	B
8.3	51.3	44.8	R
9.3	58.2	43.7	
9.5	32 15.6	48.5	
9.4	22.1	45.8	
9.2	38.7	14.0	
8.4	33 16.9	50.7	R
7.0	33.0	10.0	A
9.1	50.0	15.0	R
9.0	35 10.1	35.3	
9.5	14.9	55.9	R
8.9	19.3	40.8	R
9.4	36 8.2	39.5	
9.3	15.5	41.8	
9.2	37 36.0	44.8	R
9.3	38 11.6	53.6	
8.8	45.5	24.9	A
9.4	52.1	28.8	
9.4	59.1	33.3	R
9.5	39 4.1	32.8	
9.2	40 46.4	40.8	R
8.8	49.2	55.4	
8.5	41 21.7	31.3	R

2481—2540			
	22ʰ	+58°	
m	′ ″	′	
8.8	41 32.2	25.9	R
8.2	58.7	56.7	R
8.4	42 24.6	20.4	A
9.5	50.7	3.5	
8.9	53.4	27.9	A
9.3	44 8.8	1.4	
9.3	19.9	42.3	R
9.4	50.2	59.2	
9.5	45 24.7	16.1	
9.5	26.4	8.1	
9.5	38.5	23.4	
7.0	48.1	14.4	A
8.8	50.1	6.9	
9.2	46 38.7	16.9	A
8.7	41.9	29.4	A
9.1	44.8	22.4	A
7.9	50.6	2.8	A
9.5	59.8	40.9	
8.8	47 6.9	59.1	A
8.0	48 9.1	8.5	A
9.4	31.8	15.9	
9.1	42.2	24.5	
9.4	51.0	28.3	
9.3	54.0	59.4	
8.5	55.2	30.3	
9.3	56.5	51.2	
9.5	58.0	32.3	
9.3	58.0	28.2	
9.5	49 3.0	27.8	
9.0	15.2	31.0	
8.0	50 15.0	7.6	A
9.5	16.3	38.3	
9.4	27.7	46.0	
8.2	33.6	18.9	A
8.1	59.4	55.0	B
8.0	51 0.0	11.4	A
8.8	29.2	5.6	A
8.4	39.6	18.9	A
9.5	52 3.3	30.8	
9.3	54 6.2	31.3	
8.5	13.0	51.3	
8.5	17.9	40.6	
8.3	19.5	17.2	A
9.5	22.5	3.0	
9.5	55.2	53.2	
8.7	55 6.0	42.0	
9.1	8.2	24.4	A
9.5	32.5	30.9	
9.5	38.4	41.0	
9.5	56 7.5	46.6	
9.3	24.6	41.3	
8.5	34.8	5.3	A
7.5	39.2	51.2	G
8.0	44.2	47.8	F
9.5	57 29.5	0.7	
9.5	42.3	55.3	
9.5	58.0	40.5	
9.5	58 6.1	40.5	
9.5	7.4	53.6	
8.5	8.4	55.2	G

2541—2600			
	22ʰ—23ʰ	+58°	
m	′ ″	′	
9.5	58 40.0	5.4	
9.3	59 14.7	50.2	
9.3	0 11.0	6.7	
9.3	11.9	18.1	
5.3	29.8	38.5	G
6.5	1 7.8	57.6	G
7.3	17.3	13.5	A
9.0	29.7	6.2	A
9.5	2 38.4	20.6	
9.0	56.3	2.8	A
9.4	3 31.6	53.4	
6.1	35.8	34.5	A
8.3	40.8	31.0	A
9.3	49.9	25.1	A
8.8	4 31.3	13.6	R
9.5	5 0.5	25.6	B
9.5	3.0	29.6	
9.5	5.0	19.6	
9.5	27.2	48.9	
9.5	27.3	53.8	
9.5	6 12.2	57.0	
9.3	58.4	21.6	
8.0	7 11.6	9.6	A
8.6	22.7	30.4	A
8.4	42.5	36.5	A
9.4	57.4	35.5	
9.5	8 35.8	42.5	
9.5	57.9	15.1	
9.1	10 9.0	50.9	B
9.5	19.6	39.0	
9.2	29.8	54.1	
8.0	12 1.9	41.0	R
9.1	30.2	22.9	
9.4	13 6.2	23.6	
9.5	11.5	33.0	
9.0	14.0	41.5	B
8.0	25.1	50.4	B
9.3	43.8	0.1	
9.5	14 11.4	1.2	
9.4	40.9	10.6	
8.5	44.8	58.8	
9.0	15 59.0	42.5	
8.8	16 0.8	31.5	
8.8	3.9	18.6	
9.5	18.0	51.0	
9.0	17 23.5	23.1	A
9.0	46.1	25.1	A
8.7	46.7	56.6	
9.0	52.2	9.2	A
9.0	18 2.4	37.6	
8.1	19 16.6	52.2	B
9.3	50.0	13.6	
9.0	51.1	30.1	A
9.4	20 21.9	35.0	
7.3	21 20.8	53.0	A
7.5	25.1	32.1	A
9.4	40.4	47.2	
7.8	22 26.5	58.4	A
8.5	46.4	36.1	A
9.5	48.0	48.3	B

2601—2621				2622—2642				2643—2663				2664—2684				2685—2704			
	23u	+58°			23u	+58°			23u	+58°			23u	+58°			23u	+58°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.3	22 51.9	48.3	B	9.4	30 2.6	27.6		9.5	39 11.4	14.1		9.2	45 43.5	51.0		6.3	53 11.8	45.5	J
8.4	23 28.0	36.6		9.1	42.0	53.3		8.9	22.0	39.6		9.5	47.2	26.7		9.5	54 6.0	8.7	
9.4	41.5	56.2		9.5	31 10.2	53.3		8.9	24.2	28.1		9.5	48.2	13.4		9.3	14.4	12.0	
9.4	24 14.6	55.2		8.8	10.5	27.6		8.5	28.9	12.5		7.8	50.6	36.9	B	9.3	19.3	14.5	
7.5	19.1	20.5	A	9.5	56.9	36.6		9.4	52.3	25.6		9.3	46 2.1	40.5		9.2	55 1.6	55.2	
9.4	35.8	55.6		7.3	32 42.2	10.9	G	8.4	40 11.8	34.3		9.2	47 25.0	48.0		9.1	33.5	39.5	
7.5	43.1	38.4	A	9.5	33 25.2	43.5	B	9.2	36.9	6.3		8.8	47.5	20.7		8.5	58.8	15.7	A
9.4	47.3	17.5	B	8.2	34 8.1	35.8	B	9.1	58.5	59.6		9.4	54.0	52.6		9.5	56 27.4	30.5	
7.5	25 2.2	17.6	B	9.4	43.0	3.9		9.4	41 7.8	41.3		7.4	48 18.0	36.5	B	9.5	32.0	39.7	
9.5	34.4	1.7		9.5	56.6	6.8		9.4	57.6	39.0		9.3	19.0	32.0		9.5	33.2	57.2	
8.7	50.5	20.7	A	9.5	35 8.2	47.0		6.8	42 7.8	9.9	A	7.6	53.1	57.0	B	9.5	57 21.0	53.3	
8.2	26 37.3	29.7	A	9.5	12.3	55.8		8.7	27.5	28.7	A	8.8	54.4	37.0		9.5	58 35.1	0.6	
9.0	27 17.0	58.6		9.5	16.2	40.0		9.5	45.5	36.0		7.8	50 28.5	54.0	A	9.4	50.2	12.7	
9.5	45.5	39.6		9.4	55.4	24.2		9.0	43 7.2	20.0	A	9.5	50.3	25.6		9.5	56.7	11.7	
9.3	28 1.5	2.6		9.5	36 4.4	16.0		7.7	22.0	49.3		9.4	51 20.9	28.6		9.5	58.4	14.2	
9.0	37.2	58.3		9.0	15.6	11.2	B	9.1	39.7	19.7	A	9.5	49.0	34.5		8.8	59 7.6	5.2	B
8.3	43.0	7.3	A	8.8	50.3	58.9		8.3	43.6	50.6		9.2	50.8	17.9		9.2	19.4	31.1	
9.5	29 10.0	43.6		9.3	37 4.0	24.1		8.3	44 11.2	19.1	A	9.2	52.5	18.7		9.2	28.7	55.5	A
9.5	12.2	48.5		9.1	9.5	7.2		9.2	21.0	26.1	A	9.5	52 14.8	6.0		9.1	39.0	58.9	A
9.3	25.5	24.7		8.7	10.0	48.8		9.4	44.2	54.5	B	8.9	26.2	24.1	B	9.5	55.2	15.2	
9.5	57.9	30.6		9.3	15.4	23.7		9.3	58.0	54.2	B	9.5	48.3	51.6					

Zone +59°

1—20				21—40				41—60				61—80				81—100			
	0u	+59°			0u	+59°			0u	+59°			0u	+59°			0u	+59°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	0 1.3	56.2		9.3	7 38.1	21.2	A	9.1	14 40.6	47.8	A	8.8	19 53.5	49.3	A	9.3	27 15.8	38.3	A
9.2	3.8	32.4	A	9.5	8 7.0	37.3		9.4	15 5.1	45.4		9.4	20 29.7	6.5		9.5	21.9	11.4	
9.1	28.6	22.5	A	9.5	17.1	7.1		9.3	12.6	29.9		9.0	42.4	48.3	A	8.3	28.7	29.8	A
8.2	2 39.0	12.8	A	9.0	24.0	45.0		9.3	23.1	11.5		9.4	21 46.0	41.5		6.0	28 15.8	30.8	A
8.7	3 6.3	59.6		9.5	28.6	20.0		8.0	24.2	25.9	B	9.2	54.6	25.0	A	8.5	38.7	43.9	A
9.4	16.6	39.4		9.1	9 13.0	40.5		9.5	27.2	16.5		9.5	22 0.0	41.5		9.4	54.9	10.0	
9.2	42.5	22.5		9.5	10 23.6	7.8	B	9.1	49.6	35.9	A	9.2	6.7	20.7		9.2	29 14.9	52.0	
8.7	44.5	10.7	A	9.3	49.3	32.8	B	9.0	58.0	43.4	A	6.0	17.9	9.8	L	8.7	16.8	30.3	A
8.9	47.6	6.2	A	9.5	57.1	52.3		9.5	16 2.9	42.9		9.5	23 13.9	6.6		9.3	17.0	56.5	
9.5	4 41.0	45.9		8.0	11 14.0	31.4	A	9.4	19.8	46.4		9.0	19.8	27.9	A	9.4	18.1	55.3	
9.5	57.1	40.4		9.0	35.0	17.8	A	7.7	20.1	37.9	A	9.0	24.8	22.4	A	7.0	30 19.5	30.8	G
9.5	5 2.0	26.9		9.1	59.0	57.6	A	9.3	29.9	48.4		8.5	27.0	15.9	A	6.5	33.4	1.4	L
9.0	30.0	25.0		8.4	12 12.9	49.8	A	9.5	17 8.1	45.4		9.0	34.8	27.3	A	9.3	31 4.4	56.8	
8.8	6 6.3	31.9		9.3	17.1	39.4		8.6	21.2	18.5		8.8	24 49.1	32.8	A	9.1	7.1	19.3	
7.3	17.0	11.5	A	9.1	34.0	37.9		9.4	49.7	37.4	A	9.5	25 15.4	3.2		9.5	11.8	13.9	
8.0	27.6	54.9	A	8.9	41.3	28.6	A	9.0	19 1.0	34.9	A	7.8	24.9	45.3	A	9.5	49.1	8.0	
8.5	38.8	31.5		9.3	57.6	15.2		7.8	11.9	51.6	A	9.5	48.7	49.0		8.3	55.0	23.9	A
9.1	40.7	39.6		9.4	13 32.5	8.7		9.3	24.8	44.3		7.7	26 3.1	6.4	L	8.8	32 21.5	30.8	A
8.2	7 28.3	58.2	A	9.4	56.4	19.0		9.5	45.7	13.5		9.5	45.3	46.3		9.5	33 33.2	1.2	
9.5	30.1	32.4		9.1	14 38.5	42.9	A	8.8	52.7	45.3	B	9.5	27 3.3	44.8		7.2	39.4	7.5	A

101—160			
	0ᵘ	+59°	
m	′ ″	′	
9.5	33 54.3	55.5	
9.1	34 12.2	18.8	
9.4	14.9	9.4	
9.4	38.5	28.4	
8.5	56.8	42.8	A
9.5	57.2	55.5	
9.5	35 33.4	13.2	
9.4	36.8	56.5	
9.5	50.4	28.8	
9.2	59.3	36.6	A
8.5	36 27.3	30.4	A
9.4	49.9	31.8	
9.5	37 50.8	28.4	
9.0	51.0	32.3	A
9.5	38 30.0	33.3	
7.5	42.8	28.8	A
9.4	54.2	13.0	
9.5	39 4.5	46.3	
8.5	29.0	31.8	A
9.3	38.1	0.7	
9.5	57.1	7.0	
8.5	40 17.6	58.7	A
9.3	24.4	52.3	
9.3	40.6	42.8	
8.3	41 8.1	58.8	A
9.3	18.3	59.3	A
9.3	23.9	32.8	
9.2	41.3	20.4	R
9.1	42 35.0	31.3	
9.1	41.6	3.7	
9.2	53.6	22.8	B
8.7	43 40.8	18.0	B
9.5	44 6.7	49.5	
7.5	50.1	53.2	A
9.5	45 15.7	11.4	
9.5	22.7	14.0	
8.8	31.0	47.6	A
8.4	39.1	32.8	B
9.5	39.3	16.4	
9.4	48.6	51.4	B
8.6	46 14.0	17.5	
9.4	46.4	3.3	
8.8	47 44.7	13.3	J
2.3	59.9	55.8	A
8.7	48 1.8	18.5	A
6.3	5.3	34.6	A
8.1	5.7	14.6	A
9.5	28.7	44.7	
9.4	33.3	32.8	
8.9	34.3	33.3	A
9.2	40.8	19.1	B
9.5	52.5	52.5	
9.5	55.2	50.3	
8.6	57.1	27.1	A
9.5	49 3.1	19.5	
9.2	13.7	19.2	A
9.5	22.5	5.7	
9.4	31.4	52.0	
9.5	47.2	13.5	
9.5	50 23.5	23.1	

161—220			
	0ᵘ—1ᵘ	+59°	
m	′ ″	′	
7.2	51 15.7	43.6	G
9.5	24.1	52.2	
8.7	46.5	39.6	L
9.5	54.4	5.6	
9.5	56.8	49.2	
8.0	52 18.3	34.5	G
9.5	53 21.5	9.0	
9.5	59.0	53.5	
9.0	54 1.0	20.7	A
9.0	7.1	5.1	
9.5	19.7	45.3	
9.2	23.1	26.1	
9.5	43.0	50.5	
9.4	55 12.1	22.5	A
9.5	20.0	5.5	
9.1	43.3	33.3	R
9.3	46.6	43.6	
9.5	56 49.7	40.7	
9.4	55.9	53.1	
9.0	57 12.5	31.7	
7.2	58 0.0	4.9	B
9.5	6.7	52.6	
9.5	11.3	1.0	
9.5	26.0	52.0	
8.9	28.5	8.6	
9.5	59 0.1	46.6	
9.5	3.8	34.9	
8.0	18.5	21.7	L
9.5	47.3	3.2	
9.3	0 8.0	47.5	
8.9	10.6	51.3	
9.5	57.1	41.6	
9.5	57.2	2.5	
9.5	1 34.3	16.6	
9.5	38.3	15.6	
8.8	38.7	2.5	
9.5	54.0	40.8	
9.4	2 0.9	15.2	
7.9	34.9	44.0	B
9.5	42.8	13.3	
9.5	50.0	7.7	
9.4	3 18.8	13.1	
8.7	34.2	32.4	
9.2	49.9	49.6	
9.5	57.3	7.5	
9.3	4 27.3	52.6	
9.2	38.2	58.2	
9.5	46.9	1.6	
9.3	5 12.1	13.0	
9.0	34.7	49.5	
8.7	38.6	14.4	
9.5	40.0	1.8	
9.5	41.4	3.4	
9.4	42.8	43.2	
9.1	48.7	45.8	
9.4	57.7	43.5	
9.4	6 4.2	23.0	
9.5	13.5	35.4	
9.5	16.3	38.1	
8.0	22.5	45.0	B

221—280			
	1ᵘ	+59°	
m	′ ″	′	
9.5	7 2.1	4.0	
9.1	11.3	52.0	
8.9	8 2.6	30.5	
9.3	8.3	37.2	
9.5	16.3	36.5	
9.5	44.9	25.4	
9.5	55.3	44.1	
9.0	9 48.2	46.3	
9.5	10 23.3	17.9	
9.4	34.3	49.5	
9.5	40.0	37.4	
8.4	44.6	28.3	
9.2	11 12.2	38.2	
9.5	48.0	2.6	
9.4	12 2.6	0.0	
9.3	12.5	43.9	
9.1	37.4	14.2	
9.5	13 0.1	51.5	
9.5	12.6	36.4	
9.2	41.7	5.0	
9.4	14 27.0	47.0	
9.5	30.1	54.4	
9.2	47.6	3.0	
9.5	15 4.8	28.3	
9.4	6.5	13.2	
9.3	8.3	32.3	
8.4	44.4	48.3	
3.0	16 23.3	28.6	S
9.5	17 50.5	18.5	
9.5	55.5	21.4	
8.5	18 2.4	31.7	A
9.5	21.2	37.8	
9.5	47.1	13.6	
9.5	50.0	28.8	
9.5	19 0.9	16.2	
9.5	7.4	3.3	
9.2	28.4	23.5	A
7.3	50.5	17.1	A
9.0	57.8	1.9	
7.2	20 24.4	30.2	A
7.2	52.7	1.8	G
9.5	58.1	47.9	
9.4	21 16.3	28.5	A
9.1	59.0	48.8	
9.5	22 2.7	51.2	
9.4	5.2	1.2	
9.1	7.3	13.2	R
9.5	40.2	42.7	
7.5	23 36.3	42.1	A
9.3	40.7	9.4	B
7.4	41.3	58.2	A
9.4	51.4		
8.5			
9.0			
9.2	24		
8.[illegible]			
[illegible]			

281—340			
	1ᵘ	+59°	
m	′ ″	′	
9.5	25 21.1	37.4	
9.3	26 18.6	0.7	
9.5	22.5	34.6	
9.0	29.1	8.7	B
8.4	29.3	28.4	L
9.0	27 16.4	12.4	R
8.5	37.5	57.4	A
9.4	48.5	50.6	
9.4	54.1	51.9	
8.0	58.3	8.3	L
9.5	28 2.2	53.5	
9.2	12.2	28.3	
9.5	31.4	37.2	
9.5	38.5	25.4	
9.4	39.2	44.1	A
8.7	46.3	49.5	A
8.5	29 41.3	40.4	A
9.5	30 8.1	45.3	
9.5	41.0	50.1	
9.5	51.6	51.8	
9.5	31 13.0	13.2	
8.6	54.6	14.9	B
8.3	32 1.2	15.0	B
9.5	30.4	32.7	
9.5	38.9	34.3	
7.0	51.3	48.8	A
6.0	33 33.3	49.3	A
8.5	38.0	1.1	A
8.0	34 8.3	42.1	J
9.4	18.0	23.3	
9.0	54.0	21.5	
8.3	35 3.9	1.7	A
9.0	35.1	44.6	B
9.5	43.4	52.9	
9.5	44.4	1.0	
7.4	36 13.3	0.0	A
9.3	37 0.2	23.3	
8.0	4.8	56.4	A
9.0	10.0	38.4	A
9.5	13.9	31.0	
9.5	14.8	47.5	
9.5	49.6	37.2	
9.5	38 18.7	57.0	
8.2	36.3	43.2	A
9.3	55.9	43.2	A
9.5	39 16.5	50.7	
9.5	22.1	20.8	
9.3	27.3	50.5	
9.4	39.2	1.6	
9.5	40 11.8	26.7	
9.5	18.9	45.2	
9.5	41 2.0	20.8	
[illegible]	8.4	16.8	
	12.0	43.0	
	4.5	9.8	
	4.3	38.2	A
	[illegible].2	44.6	A
	3	44.6	A
		32.4	
		18.3	

341—400			
	1ᵘ	+59°	
m	′ ″	′	
9.5	43 13.6	25.0	
8.6	30.8	52.9	B
9.5	47.7	48.7	
8.2	44 3.0	26.3	R
9.5	8.2	39.8	
9.2	16.1	15.8	
9.5	26.0	32.7	
8.0	34.7	10.6	B
9.5	38.1	52.9	
8.0	42.0	13.0	B
8.1	43.6	7.1	B
8.7	45.8	24.5	A
9.0	45 5.4	5.8	
7.8	8.7	15.4	B
9.2	42.1	31.7	
9.0	46 1.9	52.2	
9.4	18.8	51.2	
9.5	36.0	57.1	
9.5	55.7	53.6	
8.5	47 1.5	17.1	
9.4	4.2	46.1	
9.1	9.8	2.2	
7.6	37.1	30.4	B
8.0	59.4	40.8	B
9.0	48 18.8	29.8	
8.7	20.0	19.7	R
9.4	31.8	48.7	
9.5	48.0	27.7	
9.4	57.6	27.0	
9.5	49 6.2	13.0	
8.9	13.9	45.1	
9.5	34.0	32.6	
7.7	35.3	17.7	L
9.1	55.0	0.7	
8.4	50 11.9	12.4	L
7.0	43.8	15.2	L
9.2	44.1	41.3	
8.7	45.6	43.0	B
9.5	47.9	56.2	
8.0	51 10.9	48.4	B
8.4	26.8	6.1	L
7.9	28.2	16.1	L
9.5	45.3	45.1	
9.3	48.2	45.4	
8.6	58.3	35.6	
9.5	52 1.2	28.8	
9.4	27.0	23.0	
9.5	29.2	16.2	
9.4	33.6	33.3	
9.5	36.2	50.5	
9.5	37.6	0.5	
9.5	46.7	31.3	
9.4	53 7.9	13.3	
8.7	33.2	3.7	
9.5	46.0	9.5	
9.5	49.7	1.5	
7.2	54 6.8	32.5	L
8.9	16.0	59.3	A
8.5	31.0	43.7	
7.8	34.3	48.4	A

401—460				461—520				521—580				581—640				641—700			
	1ʰ—2ʰ	+59°			2ʰ	+59°			2ʰ	+59°			2ʰ—3ʰ	+59°			3ʰ	+59°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
7.2	54 53.5	39.0	L	9.5	8 54.2	3.3		6.7	26 35.1	26.8	A	8.7	49 34.5	4.8	A	9.4	12 17.0	49.6	
9.5	55 0.0	25.9		9.5	9 1.0	53.4		9.5	27 17.5	25.8		7.0	40.5	5.8	A	9.5	29.4	37.5	
8.6	43.7	34.6		9.5	4.3	58.3		9.5	53.7	53.0		9.1	50 16.4	59.0		9.2	31.8	55.3	
9.4	48.5	42.5		8.7	6.3	26.7		9.5	28 9.1	47.0		8.9	51 0.5	2.8	A	9.5	37.9	38.4	
9.5	56 22.4	24.6		9.5	10.0	59.1		9.0	35.1	10.5		9.3	40.4	56.1	B	9.5	54.7	7.5	
9.5	23.6	18.9		6.7	12.7	20.5	L	9.4	45.6	26.8		9.4	55.8	56.9		9.0	13 4.6	13.5	
9.5	37.8	45.9		6.7	15.4	21.5	B	9.2	51.6	19.0		9.0	52 29.0	16.2	A	9.0	21.4	43.8	
9.0	49.5	25.7		9.5	28.3	53.9		9.5	29 49.8	48.0		6.8	28.1	44.2	B	8.0	31.7	57.8	B
9.3	57.3	29.4		9.4	48.8	11.9		7.9	30 23.5	55.6	B	8.2	53 34.8	27.4	A	9.5	42.5	50.2	
9.5	58.1	48.2		9.3	57.4	7.8		8.2	28.1	5.7	R	8.9	54 20.2	44.6		9.5	43.5	1.5	
9.3	57 1.5	33.5		9.5	10 11.0	59.9		9.0	31 38.2	39.1	R	9.5	43.2	5.8		9.5	14 33.8	3.6	
9.5	58 3.7	43.4		8.9	47.8	0.0		9.5	58.1	34.7		9.0	56.1	0.4	A	9.5	47.2	23.6	
9.2	16.6	16.1		9.5	11 17.0	25.3		8.8	32 35.7	58.8		9.5	55 48.7	55.4		9.3	49.9	48.6	
9.3	36.0	0.7		8.7	13 4.1	15.3		9.5	57.1	23.2		9.5	56 11.2	55.4		8.0	50.8	45.6	L
7.8	42.1	30.1	B	9.5	14.0	44.9		7.3	58.1	12.0	B	9.1	22.5	27.7		7.3	15 3.3	53.1	L
9.5	59 12.4	12.0		9.5	20.4	24.4		9.5	34 10.0	18.0		9.4	57 3.6	14.5	B	8.5	16 22.3	5.9	
9.5	31.0	14.7		9.1	22.0	37.1		9.5	28.1	0.1		9.2	55.6	52.9		6.7	38.0	44.1	A
9.5	49.5	37.9		9.5	44.2	51.7		9.5	32.3	50.4		9.0	58 2.7	40.2		7.3	46.9	23.7	B
9.5	49.8	56.6		9.5	59.5	35.2		8.9	35 52.2	59.1	A	8.9	17.5	40.2		9.1	17 16.3	4.1	
9.0	59.4	28.0	B	9.5	14 5.5	19.5		9.5	53.1	0.2		9.1	49.4	58.5	B	4.5	21.9	26.0	S
9.5	0 4.8	35.0		9.5	9.1	44.5		6.2	36 4.5	57.0	A	9.3	59 26.5	10.2		9.0	18 3.6	24.6	A
6.8	6.9	17.5	B	8.2	25.2	12.2	B	9.2	28.1	47.8		9.2	28.6	58.4	B	9.0	31.7	30.8	
9.5	17.4	7.6		7.4	45.7	51.4	B	9.4	38.2	25.8	B	9.5	0 29.3	44.4		9.5	19 12.8	23.7	
9.0	20.5	23.5		7.2	50.8	20.3	S	9.2	40.0	50.7	B	9.4	38.2	59.8		9.5	13.8	24.6	
9.5	28.5	42.8		9.2	15 45.1	55.9		9.5	37 40.6	11.0		9.5	42.4	27.1		9.5	47.6	36.1	B
9.5	29.1	55.7		6.9	57.3	0.1	B	9.5	45.0	32.6		9.5	48.9	37.5	B	9.2	54.7	5.7	
9.5	43.3	16.2		9.5	16 2.1	39.7		9.5	38 11.6	29.3		8.3	1 9.0	22.0	B	9.4	57.0	24.1	
9.5	53.4	22.6		9.5	17 1.5	37.8		8.5	38.3	59.5		9.4	2 29.8	17.5		9.5	20 1.8	33.3	
8.5	54.5	17.0		9.5	3.8	48.0		9.1	39 25.0	47.0	R	7.4	40.9	0.2	A	9.5	18.4	55.7	
9.4	1 57.0	24.2		9.4	26.7	4.8		9.5	31.3	18.2		9.2	3 27.7	41.8		8.5	22 4.6	49.3	B
9.5	2 23.7	0.4		9.5	29.6	34.5		9.5	36.9	14.0		9.0	42.1	21.9	A	8.9	6.3	54.5	
9.5	30.4	15.4		9.4	51.1	9.2		6.9	59.9	48.7	S	9.0	47.8	22.1	A	8.0	34.2	14.4	A
9.3	3 4.1	7.4		9.4	53.8	49.5		8.6	40 8.7	47.0	L	9.5	51.2	41.5		9.5	59.7	21.5	
8.5	7.9	16.2		9.3	59.0	43.1		9.5	11.5	31.0		8.9	4 24.7	39.5		9.4	23 0.4	40.0	
9.2	9.7	26.2		9.5	18 44.7	12.9		8.8	24.5	57.5		9.0	24.9	28.9	B	7.0	13.8	32.6	S
9.5	25.7	17.6		9.5	50.2	54.5		9.4	52.5	49.4		7.6	38.8	34.3	A	9.0	32.1	5.9	A
9.5	30.6	4.5		9.4	19 7.2	12.2		9.4	41 9.5	29.4		9.5	41.0	29.3		8.0	44.7	2.1	A
9.4	46.2	2.8		9.5	26.1	42.5		9.1	34.2	47.2		7.9	46.2	29.3	A	9.5	24 20.5	46.2	
9.2	55.8	13.3	B	9.5	29.4	50.1		7.6	45.7	52.3	L	9.0	51.1	46.8		9.5	21.4	23.5	
9.5	56.2	18.6		9.5	20 15.9	46.4		8.9	57.8	22.0		8.9	5 4.7	6.8		8.5	44.1	11.4	A
9.0	56.7	48.4		9.5	16.4	45.7		9.0	42 4.7	50.8	B	8.3	10.6	27.0	A	9.5	45.8	46.5	B
9.3	57.7	9.1		9.5	21 12.5	11.3		9.5	16.9	51.5		9.0	13.8	32.3	A	9.5	59.0	31.8	
8.9	59.0	24.1		9.3	26.1	19.5		9.5	21.0	29.4		9.3	20.8	32.1		8.9	25 58.8	10.9	A
9.3	4 42.9	26.3		9.1	27.9	58.5	A	9.3	43 14.5	31.1		9.5	23.2	26.4		9.3	26 7.1	3.1	
9.3	44.0	21.5		7.5	22 27.3	21.0	A	8.0	33.9	46.2	A	7.1	27.5	31.3	A	8.3	27 0.7	6.0	A
9.5	56.4	40.0		9.0	29.2	58.1	A	9.5	49.0	27.7		9.5	50.1	28.4		9.5	39.2	59.8	
9.3	5 5.3	15.1		9.4	33.0	50.3	B	7.9	44 4.5	13.2	A	9.5	50.6	29.6	B	9.5	47.2	26.0	
9.0	22.9	21.2		9.4	47.9	58.8		9.0	18.2	37.8	A	9.5	6 31.8	21.9		9.2	58.8	48.4	A
9.2	25.2	22.7		7.9	49.8	39.2	A	7.9	40.7	48.1	A	9.1	45.8	12.9	A	9.4	28 11.8	42.2	
8.1	37.2	57.1	B	9.5	23 24.1	21.9		9.5	45 20.8	22.5		8.4	7 16.2	6.0	A	9.5	26.2	4.3	
9.3	48.3	0.5		9.5	41.6	31.2		9.3	46 3.4	49.0	A	9.5	25.1	1.8	B	9.5	33.7	26.9	
9.1	53.2	23.2		9.5	49.0	48.0		8.7	26.2	31.3	A	9.0	8 28.3	21.0		9.5	42.5	30.9	B
9.5	6 14.9	4.2		8.2	55.9	54.2	A	8.6	32.7	44.6	A	9.5	53.9	32.0		9.4	46.7	42.6	B
9.5	47.8	57.9		9.5	24 26.0	23.3		9.2	58.5	24.1	A	8.4	9 16.8	29.9		9.0	49.6	38.4	R
9.5	59.5	25.1		8.4	43.3	10.2	A	9.5	47 0.6	9.2		9.4	58.2	7.6		9.5	29 8.7	44.6	
9.4	7 48.1	7.5		9.5	25 6.8	58.1		9.0	51.0	14.3	A	9.4	10 4.0	38.6		9.5	49.8	23.3	
9.5	51.4	28.8		9.5	7.2	46.0		9.3	54.0	20.3		9.5	38.1	30.0		9.5	59.6	25.8	
9.4	8 4.9	37.3		9.5	35.9	59.8		8.0	48 5.4	58.6	A	9.1	42.3	17.2		9.5	30 21.0	25.2	
9.4	41.0	4.5		6.8	26 7.0	13.4	A	9.5	49 15.0	20.5		8.5	11 13.0	30.1	R	6.0	48.0	29.6	A
8.0	48.4	49.3		9.4	32.1	57.2		9.5	23.0	24.5		9.5	12 5.2	30.0		9.0	50.8	30.8	A

701—760				761—820				821—880				881—940				941—1000			
	3ʰ		+59°		3ʰ—4ʰ		+59°		4ʰ—5ʰ		+59°		5ʰ		+59°		5ʰ—6ʰ		+59°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.3	30	54.9	17.0	9.5	58	5.3	27.2	9.5	28	28.8	20.3	9.4	16	48.0	53.7	9.5	55	3.8	9.8
9.0	31	3.2	6.1 A	8.9		8.0	3.4	9.5		33.3	25.2	9.5	17	57.4	45.9	9.2		16.7	18.9
8.7		58.2	2.8 A	8.3		8.6	46.0 B	9.5	29	6.9	47.9	9.4		58.3	9.5	9.2		28.5	19.3
9.5		59.0	56.7	8.4		22.4	59.2	9.5	30	8.7	4.6	9.5	19	37.7	16.9	9.3	56	15.9	9.3 B
9.5	32	0.4	47.5	8.7		44.3	59.7	8.8		11.0	12.9	9.5		38.0	27.7	9.5		45.6	50.3
9.5		58.1	5.8	8.0		46.4	47.5 A	6.9		46.6	14.4 L	9.4	20	18.5	2.8	9.4	57	3.5	53.5
9.5	33	0.7	10.0 B	7.5	59	3.2	41.5 A	9.0	32	20.2	35.4 A	9.4		43.5	21.2	9.5		41.8	56.7
8.0		21.7	53.0 A	9.5	0	4.7	43.6 B	9.1		39.3	40.6 A	9.4	21	5.5	9.4	7.3	58	5.6	10.7 A
9.5		49.1	8.0	8.2		20.8	3.9 B	8.2		55.2	36.4 A	9.5	22	7.9	16.8	7.8		16.5	56.7 B
9.5	34	2.9	49.3	8.9		20.9	47.9 A	9.0	34	12.6	36.8	8.3		13.1	24.5 A	8.8	0	0.6	53.7
9.0		25.2	44.0	9.0		51.5	3.1	8.2	35	55.7	13.9 A	7.7		29.7	39.0 A	9.5		8.4	8.3
9.4		46.8	59.4	9.4	1	15.9	15.8 A	9.0	37	4.7	18.4 A	9.0	23	7.5	12.3	9.0	1	11.0	17.1 A
9.0		47.3	20.4	9.4		23.6	18.7	9.4		31.9	16.8	9.2		53.7	28.9	6.5	3	13.4	15.0 B
9.5		54.6	12.0	9.0	2	2.3	26.6 A	9.2	39	1.2	22.6 A	9.3	24	27.4	18.8	9.0		35.4	21.2
9.5	35	46.2	11.9	9.3		2.3	52.8	9.4		3.2	28.0	7.6	25	12.0	16.0 L	8.9	4	3.4	22.1
9.5	36	7.5	39.3	9.5		10.5	30.8	9.4		50.4	43.9	9.0		13.3	42.8	9.1	5	18.0	39.0
9.3	37	3.2	52.2 B	9.5		14.3	51.9	9.0		53.4	47.4 A	9.4		42.4	10.8 B	7.7	6	9.0	36.3 A
9.5		16.7	13.8	9.5		43.6	15.1 B	9.4	40	36.2	15.4	8.5		55.0	39.9	8.0		21.0	52.2 A
9.5		49.5	37.9	8.8	3	39.5	33.5	9.0	42	43.8	18.4 A	9.4	26	55.4	22.2	5.0		51.0	3.3 S
8.5	38	36.0	40.4 A	8.5	4	0.1	14.6 A	9.5	44	30.2	7.2	9.1	27	8.4	7.5	8.0	7	1.0	53.2 A
9.5		44.2	40.9	8.5		26.6	56.8 A	9.4	45	0.6	23.0	9.5		26.4	27.3	9.5	8	35.6	10.2
9.3		51.0	17.5	9.5	5	12.5	28.9	9.5	46	38.5	57.7	9.0	28	53.0	8.4	9.3	9	2.5	52.2
9.3		55.7	31.4	9.5	6	58.9	43.5	9.5	48	49.0	42.0	8.9	29	5.4	57.3 A	9.5		12.1	59.7
7.2	39	52.9	53.0 A	9.5	7	30.2	0.7	9.1	50	30.4	31.7	9.4	30	0.6	44.3	7.0		14.5	24.9 A
9.5		53.8	51.8	8.5	8	5.4	10.4	9.0	51	10.5	37.1	9.0		29.4	38.0 A	9.5	10	3.0	22.5
9.5		56.7	48.2	9.0		25.1	49.5 R	9.5	52	5.3	16.9 B	8.4		40.6	50.2 A	9.5	11	11.6	14.1
9.5	40	8.6	46.7 B	9.5		40.0	36.1	8.3		9.9	58.6 L	9.4		55.2	26.6	8.4		34.0	37.9 A
9.0		37.3	9.5	9.5		56.0	37.1	9.4	53	38.5	33.1	9.5		55.3	20.5	7.5		36.5	46.9 A
9.5	41	16.6	50.9	8.2		56.1	32.7 J	8.8	54	20.3	34.0 B	9.4		56.2	45.2 B	8.0		45.0	43.4 A
9.5		51.2	44.5	9.1	9	8.1	23.5 B	8.3		23.7	7.7 B	9.0	33	5.9	45.8 A	9.5	12	16.2	2.8
9.0		56.9	55.2 A	8.9		53.4	54.5 B	9.2	56	11.4	40.5	8.7	34	30.3	33.9	9.4		51.7	53.0
9.0	42	43.3	46.1	9.5	10	24.6	50.8	9.5	58	39.7	34.8	9.4	37	4.0	37.4	9.5	13	18.0	6.5
9.5	43	32.8	35.9	6.5		38.5	16.2 L	9.5	59	45.8	13.9	9.0		10.1	44.8 A	9.5		21.3	1.3
9.4		44.2	17.7	9.2		49.2	41.5	9.5	0	12.4	35.0	9.5		26.2	47.3	9.5		43.0	10.2
9.4		44.5	45.1	7.8	11	12.4	23.3 L	9.5		31.2	2.1	9.1		40.1	39.2 A	9.3	14	6.6	28.7
7.0	44	14.3	12.1 B	9.2		33.0	57.0 B	9.5	1	2.3	52.3	9.2	38	25.4	18.0	8.5		46.4	28.7
9.5		57.0	28.0 B	9.3		39.5	30.2	6.5	2	28.7	12.4 A	9.0		38.5	11.2	9.3	15	59.2	58.2
9.2	45	23.8	41.4	9.0	12	2.9	31.7	9.3	3	8.8	37.4	8.8	39	45.3	18.1	8.4	16	0.5	3.3 A
9.0		26.9	11.3	8.0	13	21.6	54.8 A	9.4		37.0	33.7	9.5	41	45.2	22.5	9.5		15.4	20.5
9.5	47	8.4	0.9	8.8	14	26.8	17.2 A	9.5		38.7	24.8	5.7	42	1.3	50.5 A	8.8		33.3	22.0 B
9.5		12.7	49.8	9.0	15	26.8	0.5 A	9.5	4	38.7	50.5	8.8	43	21.5	57.2 A	9.4	17	5.2	40.1
9.3		26.5	32.8	9.5	16	20.4	49.9	9.1		39.7	18.3	9.2		45.4	17.1	9.1		24.4	9.5 B
9.0	48	17.9	7.0	9.4		20.4	18.2	8.8		47.8	46.5 B	9.5	44	11.0	50.8	9.5		25.5	51.7
9.5	50	24.7	55.3	9.4		29.4	3.3 B	9.4		58.3	26.8	7.7	45	16.5	22.2 F	9.0		59.1	39.9 A
9.5		25.2	57.2	9.5		58.8	10.8	8.8	6	1.2	35.4	9.2		32.5	34.0	9.2	18	32.0	36.0 A
9.3		39.1	30.9	9.4	18	21.5	59.4 A	9.5	7	17.2	15.4	9.3	46	2.8	34.0	9.5	19	0.6	58.7
9.1	51	1.5	0.0	9.5		49.8	1.6	9.1	8	22.2	10.5	9.5		28.3	1.8	9.3		27.1	5.5
9.5		23.8	34.5	9.5	20	12.9	43.0	8.6		34.7	1.2	9.5		59.4	58.2	9.5		47.4	35.5
9.5		26.0	24.0	9.0		14.3	33.1 B	9.5		55.4	40.0	9.5	47	10.8	22.5	8.2	20	25.0	0.9 B
9.5		59.4	22.1	9.0		30.3	58.7 A	7.0	9	31.7	7.5 A	8.5		38.5	52.2 A	9.5	21	0.9	41.9
9.3	52	2.5	44.5	8.5	21	17.3	9.6 L	9.4		35.7	37.2 B	9.0		43.7	34.0 A	8.7		1.0	33.3
9.4	54	6.0	40.0	7.2	23	19.3	5.7 L	9.1		42.9	18.3	9.5		52.8	9.2	9.5		11.6	13.1
8.6	55	15.6	44.5	8.5		39.7	0.0 L	9.4	12	19.9	29.5 B	9.5	49	10.8	27.6	9.3		35.4	33.9
9.2		36.9	10.7 B	9.3	24	24.7	22.3	9.0		21.2	0.2	9.5	50	14.4	47.8	8.5		38.0	18.1 P
9.1		44.0	24.1	9.5		27.3	15.4	8.8		33.0	9.5	8.6	51	17.3	52.5 A	8.4	22	43.0	53.2 A
9.5	56	2.5	35.5	7.5		56.8	47.1 B	9.5		35.4	42.0	9.0		41.8	38.9	7.0	23	32.4	45.9 A
9.5		14.0	28.2	8.7	25	25.2	2.3 B	9.4		44.7	9.0	6.7	52	15.6	23.4 B	9.3	24	56.8	9.7
9.5	57	2.2	31.1	9.3		25.6	21.3	9.4	13	13.5	5.6	9.4	53	2.6	18.4	7.8	25	19.1	32.3 A
6.5		11.6	32.5 A	9.5	26	15.5	7.9	9.5		18.6	54.7	9.5		50.8	41.0	9.5		45.9	8.5
9.5		14.2	30.1	9.5	28	1.2	33.7	9.5	14	45.2	28.7	9.0	54	14.0	23.4	9.4	26	3.5	7.0

1001—1060				1061—1120				1121—1180				1181—1240				1241—1300			
	6h—7h	+59°			7h	+59°			7h—8h	+59°			8h—9h	+59°			9h—10h	+59°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	26 35.4	10.7		9.5	0 38.4	1.6		8.8	42 40.2	46.3	A	9.0	24 43.8	6.1	A	8.0	21 54.6	31.9	A
9.0	27 59.8	2.4		9.3	53.7	14.9		9.2	52.8	40.5	A	9.4	25 25.4	21.5		8.7	22 13.7	56.7	A
9.5	28 23.9	11.6		9.4	1 58.0	59.5		9.2	43 24.5	1.3	A	7.1	29 48.4	35.3	A	9.1	41.0	16.8	
9.2	31.8	49.8		9.5	3 5.2	33.3		9.0	44 46.3	51.7	A	7.8	30 29.6	33.9	A	9.0	23 27.8	35.9	A
9.5	29 17.5	29.1		5.0	12.5	52.5	G	9.5	45 20.3	13.3		9.1	31 12.4	24.0	A	9.4	25 46.0	16.3	
8.3	41.0	49.2	F	9.3	58.3	17.4		9.0	23.4	54.7	A	9.0	32 7.5	23.5	A	8.7	26 53.8	10.4	A
8.9	30 28.8	26.1		7.7	6 4.7	9.5	A	8.7	47 14.9	5.3	B	9.2	52.0	55.2		9.2	27 3.4	35.3	B
9.0	52.5	14.1		7.8	37.2	23.1	A	8.8	57.6	19.7		9.5	33 24.9	14.8		9.5	25.7	34.5	
9.5	31 33.7	11.2		9.0	7 11.9	21.5		9.1	48 46.2	16.5		9.4	24.9	29.6		7.3	28 24.9	11.4	A
9.1	49.4	46.5	B	8.5	14.4	57.5	A	6.0	49 10.6	26.6	G	8.9	34 4.1	21.5	A	9.5	54.2	47.0	
9.0	55.7	47.1	A	7.0	17.5	30.3	A	8.4	50 0.0	9.8		9.5	37 4.9	49.4		8.2	29 1.5	30.6	A
8.5	55.9	59.3	A	8.8	30.7	14.8		9.5	16.9	29.0		9.5	39 16.1	25.2		9.5	16.3	25.7	
8.1	32 4.0	36.6	A	9.4	8 1.5	51.5		9.4	36.2	37.6		9.2	30.3	24.1	B	7.7	30 24.0	13.8	A
9.2	35.4	46.4	A	8.9	11.4	36.2	A	9.5	51 0.4	11.8	B	9.1	51.8	24.2	B	9.3	31 23.7	50.9	A
5.0	33 26.3	34.4	A	9.5	11 1.9	28.4		9.5	53 47.5	13.4		9.2	58.3	23.3		9.2	25.6	45.0	A
9.1	32.2	55.5		9.5	53.2	9.0		7.0	53.9	39.6	G	8.6	41 14.2	12.9		9.2	32 35.8	35.1	B
9.2	35.3	53.5		9.3	12 8.2	40.1	A	9.2	54 34.0	13.0		9.5	17.8	49.8		9.0	33 2.1	59.7	B
9.2	38.1	57.6		8.4	12.7	14.8		9.2	34.4	29.2	A	6.5	37.9	36.0	B	8.6	22.9	48.0	A
8.8	35 17.4	49.6	A	7.8	14 25.8	26.7	F	8.9	55 18.9	58.8	A	8.0	42 19.8	25.3	A	9.3	43.8	36.3	
9.4	36 50.9	35.0		9.0	15 58.8	37.6		9.5	34.8	24.1	B	9.3	43 2.0	15.5		8.3	34 33.9	5.5	A
9.2	37 4.8	27.5		8.9	58.9	6.6	B	9.4	35.9	57.7	A	9.4	45 6.9	0.2		9.4	34.5	52.4	
9.5	30.4	33.6		9.5	16 3.0	55.5		9.0	56 33.7	10.0	A	8.5	12.3	58.2	A	8.9	35 10.9	30.9	A
9.1	38 35.2	14.8	A	9.0	18 17.5	42.3		9.4	58 11.5	28.4		8.8	40.8	9.9	A	9.5	41.2	48.4	
8.5	54.4	27.3	A	8.2	50.5	36.9	B	8.2	39.8	37.0	A	9.5	53.0	42.0		8.3	37 15.6	58.7	A
9.2	39 27.5	55.4		9.5	19 22.5	24.2		9.5	59 26.9	41.0		9.5	47 5.8	46.1		9.5	38 36.8	49.4	
9.0	35.9	50.0		9.5	31.4	51.0		9.5	35.0	50.8		9.2	47.1	20.8		9.5	58.1	19.8	
9.5	40 13.2	9.5		8.9	58.2	8.0	A	9.3	36.7	19.0		9.5	56.2	3.3		9.4	39 2.3	30.7	
6.0	18.8	36.8	A	9.5	20 51.9	56.5		9.5	2 1.0	17.0		9.3	48 23.9	50.9		4.0	40 40.3	42.1	A
9.4	42.5	20.3		9.5	21 23.6	33.1		8.5	29.4	23.1	A	8.3	47.8	49.3	B	9.4	42 9.4	0.7	B
9.5	41 39.3	29.2		9.4	47.9	34.9		8.9	3 7.1	30.5	A	9.5	50 19.8	12.8		9.0	57.5	13.3	A
9.5	42 29.4	29.7		9.0	22 15.4	51.5		8.8	20.6	37.0	A	9.5	29.6	16.8		9.1	43 15.9	21.7	
9.4	44 14.4	25.2		8.5	23 22.4	50.6	A	8.6	4 34.4	39.6	A	8.0	31.4	58.3	A	9.3	44.0	17.2	
7.8	37.8	21.9	B	9.5	33.5	12.5		9.2	58.2	39.1	B	8.7	35.2	5.0	A	9.2	47 34.8	40.5	A
8.5	45 10.7	23.4		9.4	36.8	27.1		7.3	59.9	37.9	A	9.5	51 24.0	13.5		7.1	48 19.2	38.7	A
9.0	24.3	10.0	A	9.5	41.2	42.2		9.2	5 24.2	39.3	B	9.2	52 8.7	19.1	B	8.0	50.5	26.8	A
9.4	46 20.2	22.3		9.4	25 36.8	22.8		9.5	6 21.0	16.5		9.3	37.7	19.0	B	8.2	55.3	51.5	B
9.5	47 15.5	25.1		9.5	42.7	31.6		9.5	7 18.5	33.7		6.2	55 24.9	54.8	A	9.3	49 24.8	26.9	
8.9	48 14.1	39.5	A	9.4	26 52.0	59.1		9.1	8 10.6	39.9		7.6	56 13.7	26.9	A	9.5	58.5	24.0	
9.5	24.5	15.4		7.2	27 29.0	52.5	A	9.0	16.4	54.8	A	9.1	24.4	6.0	A	9.5	50 46.9	8.8	
9.4	57.4	53.1		8.0	28 4.5	25.1	A	9.5	9 34.8	21.6		8.7	57 8.1	39.5	A	9.5	51 47.0	41.3	
9.5	49 4.0	46.7		9.5	29 4.7	15.9		8.0	46.3	32.8	B	7.0	58 38.3	43.0	A	9.5	53 19.2	26.5	
8.9	50 15.8	3.0		9.5	27.5	29.3		9.5	12 27.0	50.8		9.2	40.3	49.0		9.4	20.1	19.0	
9.0	38.5	29.1		5.0	30 43.2	1.6	A	9.4	14 46.7	17.2		8.2	59 14.1	50.8	A	9.5	54 6.0	32.5	
9.5	51 25.2	10.0		9.1	59.2	31.0		9.5	50.3	2.7		9.2	0 45.4	42.4	A	8.3	10.5	53.6	A
9.5	36.5	21.8		7.5	31 23.5	37.3	A	8.2	15 30.7	51.4	A	7.7	1 22.1	19.1	A	9.1	55 49.3	10.6	
9.1	52 38.2	56.5	A	9.1	34 22.0	59.5		9.5	47.6	10.5	B	9.5	3 35.9	29.7	B	9.0	57 11.0	49.7	A
9.1	53 5.1	29.3	A	9.4	35 4.9	59.0		8.8	16 26.5	13.2	A	8.9	4 59.9	18.7	B	9.3	58 2.2	23.5	
9.2	18.9	11.5	B	8.0	36 9.1	26.0	B	8.3	49.8	17.9	A	9.5	7 57.0	49.0		9.5	55.5	46.7	
9.4	54 45.6	5.0		9.5	15.2	21.3		9.4	58.8	12.2		8.6	8 16.1	1.0	B	9.1	59 53.1	16.6	
9.1	50.5	27.0	A	9.4	19.5	52.7	A	8.5	17 11.9	53.3	A	9.5	9 28.3	33.5		9.0	57.6	48.8	A
8.8	55 23.8	28.4	A	9.3	20.7	41.0	A	9.4	18 32.8	45.4	A	9.1	10 17.5	39.8	A	8.3	0 38.3	20.0	A
8.2	58 14.7	35.8	B	7.8	38 17.0	23.9	A	9.0	19 3.4	49.5	A	9.5	58.8	43.6		9.4	1 25.5	15.6	B
7.3	38.9	16.9	P	7.5	39 42.7	50.8	A	9.3	9.0	2.7	B	9.5	11 10.8	42.6	B	8.5	2 43.2	17.0	A
9.3	59 30.7	0.6		9.4	47.5	15.0		9.5	21 15.3	50.4		9.0	12 46.9	56.2	A	9.3	3 18.3	2.2	
9.3	33.9	43.9	B	8.1	40 57.8	1.8	B	9.5	41.9	7.5		9.0	13 24.7	57.2	A	8.9	21.8	9.9	A
9.5	36.4	30.5		9.3	41 39.8	56.2	A	7.0	22 16.5	4.4	A	9.4	15 5.2	24.3		9.5	4 56.1	28.0	
9.4	43.3	33.2		8.3	54.5	19.0		8.9	38.5	17.8		9.5	54.2	55.2		9.5	6 42.3	40.3	
9.0	44.0	21.6		9.2	57.5	8.0	A	9.4	23 20.5	28.3		6.8	20 25.0	23.2	A	9.5	9 16.6	3.2	
9.5	0 5.3	30.5		9.1	42 3.4	9.7	A	9.4	24.8	19.2		9.3	25.9	48.9	A	8.7	11 0.5	20.5	A
9.5	10.3	32.7		9.5	12.7	40.9		9.3	27.9	41.0		9.5	21 17.2	59.7		8.2	12.5	46.3	B

1301—1360				1361—1420				1421—1480				1481—1540				1541—1600			
	10u—11u	+59°			11u—12u	+59°			12u	+59°			12u—13u	+59°			13u—14u	+59°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	11 48.4	21.0		9.5	7 8.4	27.2		8.5	1 41.7	10.7	A	9.4	57 45.6	28.5	B	9.5	50 1.9	10.0	
9.3	52.0	50.2		8.5	21.6	54.6	B	8.0	46.0	49.8	A	8.8	58 35.5	39.8	A	9.0	51 17.5	17.5	A
9.3	58.9	36.6	B	8.8	8 3.5	28.6	A	9.0	2 17.6	11.6	A	9.3	59 26.1	15.4		8.4	33.7	12.4	A
9.1	12 18.4	26.9		8.2	6.4	44.1	B	9.0	34.1	14.5	A	8.5	45.6	34.2	A	9.3	52.0	6.2	B
9.5	13 3.6	40.3		9.2	9 8.3	48.0		9.3	3 46.5	54.3		9.0	0 22.6	55.6	A	9.5	52 43.3	52.8	
7.9	55.4	8.7	A	9.0	22.1	49.8	A	9.0	56.7	11.6	A	8.5	1 31.5	54.3	A	9.5	54 27.6	4.9	
9.5	14 26.6	1.3	B	7.8	10 41.3	40.5	A	8.9	4 35.0	44.9	A	9.5	2 22.5	12.0		8.5	31.8	46.5	A
9.2	33.8	15.0		7.8	12 1.7	34.1	A	9.3	49.0	43.9	B	9.1	3 29.7	21.9		9.3	46.8	38.2	A
7.8	16 19.7	40.6	A	7.8	13 4.6	16.5	A	9.4	7 16.7	21.8	B	9.1	39.4	21.4		9.4	55 32.5	23.6	A
7.4	47.1	52.7	A	9.0	16.7	12.5	A	9.5	33.2	41.5		9.0	4 32.5	32.9		9.1	56 59.2	34.0	
9.5	18 22.5	19.5		8.9	14 51.3	23.2	A	8.4	58.5	45.3	B	9.4	5 57.6	0.7		8.9	57 5.2	16.0	
9.5	21 6.5	6.7	B	9.3	15 1.1	24.3	A	9.2	8 10.6	59.2		9.3	6 28.4	41.3		9.2	58 47.0	50.1	
9.3	22 23.4	39.9		9.5	47.4	9.2		9.2	9 13.5	45.4		7.8	47.5	12.9	S	8.7	50.8	46.1	B
9.5	24 25.0	22.4		9.0	57.7	53.4	A	9.1	13.6	21.9		9.5	7 47.6	27.6		8.0	59 29.8	41.6	A
9.5	25 17.9	34.8		9.4	16 8.6	41.5	B	8.8	44.1	13.5		9.5	8 26.0	49.8		9.2	46.8	55.8	A
9.5	24.4	40.7		9.5	17 10.5	29.2		9.1	14 31.6	55.6	B	9.5	9 14.5	8.0		9.1	0 3.8	49.4	A
9.4	28 48.1	35.9		8.6	31.0	33.4	A	9.0	15 19.5	44.0	R	9.3	59.2	43.8		7.3	15.9	32.9	A
9.5	48.5	17.5		9.4	18 5.3	6.2		9.5	17 38.4	35.2		9.2	10 31.2	44.3		9.3	55.3	39.0	A
9.5	30 44.3	56.0		9.4	19 13.1	20.0		9.5	19 13.1	32.2		8.5	11 27.6	31.2	A	9.1	2 41.3	22.4	
9.2	31 37.5	10.2	A	8.3	26.3	30.5	A	9.5	18.2	55.7		8.0	12 3.3	30.9	A	8.8	4 52.8	51.4	A
9.4	32 53.9	31.9		9.2	20 59.0	31.7	A	9.4	21 14.6	44.5		9.5	16.2	52.7		9.5	5 1.7	10.6	
9.5	59.1	40.2		9.5	21 44.7	47.0		9.4	22 19.5	20.3		8.5	18.6	22.7	A	6.5	6 25.6	13.1	F
8.8	35 34.7	28.5		9.3	23 48.3	26.5	S	9.5	49.0	44.3		9.5	13 15.9	47.4	B	9.5	8 17.8	56.3	
9.5	50.4	22.5		8.5	48.3	14.0		5.7	23 10.2	12.0	A	9.5	35.1	48.7		7.7	9 8.9	10.5	B
8.7	36 52.8	49.2		9.5	24 41.0	43.5		9.2	11.3	45.3	B	9.5	16 4.3	31.9		9.4	27.6	41.5	
9.3	37 54.6	23.4		9.4	25 52.4	14.0		6.2	17.2	34.2	A	9.5	17 7.2	11.5		8.3	45.3	55.3	A
9.0	54.7	27.8		9.0	26 31.5	50.8		9.5	25 14.6	40.8		9.4	15.6	21.3		9.5	10 18.3	40.5	
9.4	58.4	5.3		7.8	27 31.0	0.8	A	8.4	27 53.0	2.6	F	9.0	19 2.1	43.8	A	9.3	43.2	2.6	
9.4	38 3.8	1.3		9.3	48.6	2.2		9.1	28 19.7	52.1	B	9.4	47.6	6.1	A	9.0	11 8.3	25.4	
9.1	39 40.9	31.4		9.5	28 14.8	41.5		9.3	20.0	3.1	S	9.5	20 19.9	55.6		8.4	47.2	4.2	A
9.5	41 10.0	47.7		9.5	29 24.9	17.7		9.3	21.9	27.5		8.7	37.0	39.1	A	9.2	12 35.8	41.6	
9.1	43 5.9	9.7		9.3	28.4	14.7	B	9.5	30 17.6	12.4		9.4	22 3.3	33.2		9.1	59.9	45.5	A
8.3	44 17.2	49.1	B	8.9	46.5	35.6	A	9.5	31 25.2	43.3		9.0	56.6	5.1		9.2	13 25.8	44.5	
9.1	45 54.4	27.1		8.3	30 25.1	53.8	A	8.9	58.1	11.5		9.1	23 11.7	48.2		8.5	14 24.4	40.1	A
9.4	47 41.6	12.4	B	8.9	31 29.6	36.3	A	9.5	33 31.8	33.7		9.5	24 24.8	50.3	B	8.5	49.8	58.2	A
9.5	48 18.5	37.9		8.9	33 31.0	44.2	A	9.1	34 30.9	31.9		9.5	25 31.1	13.4		9.5	15 10.0	32.9	
9.0	50 45.8	50.2	A	8.5	31.6	43.7	A	8.0	46.5	45.3	A	7.7	26 11.6	41.3	A	9.2	16 27.9	8.2	A
7.0	55.0	41.8	A	9.3	34 39.6	17.7	A	9.5	35 28.1	2.6		9.5	27 35.7	16.2	B	9.5	17 4.0	17.0	
9.0	58.5	41.9	A	9.5	58.8	59.7		8.9	36 9.8	23.7		9.2	28 45.6	24.3		9.5	5.2	14.0	
9.5	51 2.7	29.1		7.5	35 57.2	13.0	A	9.1	49.2	34.5		9.4	30 50.8	5.3		9.0	18 22.3	45.0	
9.4	59.4	38.8		9.3	39 13.6	2.3	A	8.1	37 11.1	39.3	R	9.5	32 11.1	10.1		9.4	19 32.4	50.9	
9.4	52 22.5	23.2		8.5	40 59.4	49.8	A	8.9	38 2.1	17.9	A	9.1	33 29.9	43.1	B	9.0	22 30.7	15.5	
9.1	28.8	59.0	A	9.5	42 50.2	21.5		8.0	5.1	27.6	A	9.5	35.2	5.4		9.5	23 1.8	55.8	
9.5	55.8	38.8		9.5	52.1	57.7		8.1	26.7	9.5	A	9.3	57.3	34.7		8.8	24 34.7	0.3	A
6.6	53 28.3	26.6	A	9.0	43 49.2	43.2	A	9.1	42 16.4	28.9	A	8.6	34 28.3	56.8	A	9.4	56.8	33.9	
8.8	55 47.2	41.0		9.1	44 41.7	11.6		9.0	27.3	32.6	A	9.4	35 30.6	23.5	B	9.5	25 8.7	56.3	
9.4	56 13.2	25.0		8.8	45 54.6	33.0		9.5	45.2	34.9		8.4	36 5.8	48.0		9.5	26 14.3	2.3	
9.0	18.3	13.8		8.5	48 47.5	18.0	A	8.7	44 9.4	51.0	A	9.1	37 2.8	56.0	B	9.5	14.9	11.0	
9.4	41.9	15.8		9.1	49 2.6	37.2	A	8.3	45 30.3	32.2	A	9.5	4.3	58.5		8.4	47.9	16.0	A
9.3	58 50.8	35.8	B	9.5	30.1	49.8		8.2	36.9	27.3	A	8.4	25.1	34.6		9.4	27 27.7	8.2	B
7.3	0 15.2	59.7	A	8.5	51.6	6.7	A	9.4	46 3.1	22.7		9.0	40 11.7	2.3	A	7.8	28 36.0	3.3	A
8.8	1 59.1	41.0	A	9.4	50 52.5	55.2		8.2	53.3	42.8	A	9.4	43 22.8	56.2	B	9.4	29 40.4	7.2	
7.0	3 7.5	42.1	A	9.5	51 40.7	13.0		9.0	47 25.9	36.7	B	6.5	45 29.1	14.6	A	9.5	52.3	42.5	
9.3	4 51.1	26.0		8.0	52 19.8	52.8	A	9.1	49 32.7	51.6	A	9.1	55.8	51.4	A	9.5	33 12.4	8.3	
8.7	53.3	55.6	B	9.4	24.3	31.4		8.1	52 17.0	9.5	B	8.5	46 55.9	42.1	A	8.4	36 8.2	18.2	A
9.1	6 15.6	59.8	A	9.3	55.7	2.2		9.4	19.1	9.9	B	9.4	47 3.7	7.7	A	9.3	37 41.4	29.8	B
9.4	48.6	16.9		9.1	58 28.1	22.9		9.4	53 33.2	11.0		9.2	54.8	25.3		9.5	44.6	10.6	
9.3	48.8	11.4	B	9.5	0 25.0	28.6		9.2	55 1.4	46.8		9.5	48 26.7	21.4		9.5	58.1	29.3	
9.1	52.7	39.6	A	9.5	26.1	22.0		9.5	36.0	35.8		8.4	38.3	36.7		9.1	38 9.8	28.1	B
7.5	7 4.3	0.1	A	7.5	59.7	21.6	A	9.5	56 3.0	25.5		9.5	49 19.7	20.4		9.1	11.8	41.9	B

1601—1660				1661—1720				1721—1780				1781—1840				1841—1900			
	14ᵘ—15ᵘ	+59°			15ᵘ—16ᵘ	+59°			16ᵘ—17ᵘ	+59°			17ᵘ	+59°			17ᵘ—18ᵘ	+59°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	38 31.1	48.3		9.5	30 44.1	37.5		8.5	20 47.6	3.2		9.4	0 22.5	25.5		9.2	43 33.0	20.9	A
8.8	39 9.4	39.6		8.3	32 27.7	34.9	A	9.4	53.4	57.5		8.9	1 20.6	24.0	A	9.2	44 9.3	29.5	A
9.0	26.6	13.5	A	9.5	33 13.9	21.5		9.5	21 41.8	25.4		8.8	20.9	46.6	B	7.5	45 1.2	18.6	A
9.4	35.1	12.0		9.5	34 42.1	11.8		9.5	22 54.5	52.0		9.4	32.9	55.2	A	8.4	48.6	52.4	A
9.5	35.4	29.0		9.5	36 41.5	26.7		8.8	23 2.8	7.6	A	9.1	2 43.0	38.5	A	9.4	51.4	51.3	
9.2	40 28.7	29.5		9.0	37 2.9	14.8	A	9.5	8.2	26.3		9.5	3 15.0	39.4		9.4	46 10.2	33.3	B
9.3	41 55.6	11.6		9.1	5.8	54.0	B	9.3	25 3.6	47.6	B	8.5	38.9	7.4	A	9.5	25.2	11.1	
9.5	43 24.1	29.8		9.1	15.7	13.8		9.5	26 26.2	5.6		9.5	42.1	20.4		9.5	51.7	16.1	
9.4	44 32.7	30.8		8.5	38 18.7	48.9		9.4	27 53.9	38.2	A	9.2	4 44.6	15.4	A	9.0	47 3.8	58.4	A
9.5	45 23.1	0.6	B	8.8	40 34.0	34.6	A	9.2	28 5.9	48.2		9.0	7 29.1	19.8	A	9.4	48 1.1	1.5	B
8.5	57.1	25.4		9.5	41 17.3	15.3		9.5	18.4	24.1		9.0	42.1	15.4	A	7.5	5.2	4.4	A
9.2	47 25.2	0.7	A	9.4	17.8	22.0	B	9.4	30 21.0	7.6		9.5	8 45.7	38.6		9.3	49 22.9	49.0	
9.4	32.8	43.8		9.3	23.2	14.8	B	9.5	31 23.9	48.6		9.5	57.2	25.1		8.8	24.3	40.2	
9.5	37.5	28.5		8.5	42 3.8	52.3	A	8.0	32.4	58.9	F	9.2	9 10.6	12.9	A	9.3	25.8	24.2	
5.7	44.6	52.8	F	7.0	54.0	45.9	A	9.4	32 0.9	20.7		9.2	32.1	13.9	A	9.3	50 12.7	14.7	B
9.0	48 52.3	39.4	S	9.0	43 15.6	51.6	A	9.0	33 2.7	26.7	B	9.5	10 43.6	11.9		9.5	17.3	53.0	
9.5	49 5.0	51.0		9.1	44 16.0	15.6		9.2	4.5	39.7		9.5	11 4.9	58.7		9.5	30.0	41.1	
9.5	50 14.9	48.5		8.2	36.9	55.8	A	8.0	42.8	9.5		9.5	9.5	47.8		9.5	36.2	24.9	
9.3	51 40.7	8.4		9.1	39.0	18.7	B	8.5	51.9	38.2		9.5	58.3	19.9		8.6	51 12.9	58.8	B
7.8	52 54.5	58.2	A	9.3	45 6.2	11.6		9.0	34 26.4	46.7		9.1	13 10.3	21.6		9.4	59.0	24.0	
9.0	53 36.9	6.5	B	9.5	46 0.1	41.0		8.2	35.8	14.9	B	9.5	56.4	3.4		8.5	52 32.8	56.6	
9.1	49.9	7.0		8.8	47 13.6	26.6	A	9.5	47.9	15.6		9.5	17 55.3	14.9	A	8.6	43.2	52.6	
9.5	55 34.2	8.9		9.3	48 12.3	8.4	A	9.3	35 59.2	43.7	B	9.5	59.6	48.1		9.5	53 21.3	35.8	
9.5	58 29.2	7.5		9.1	21.5	54.8		9.2	36 13.6	28.8		8.5	18 24.0	20.0	A	9.3	49.5	6.3	
9.5	56.8	32.5		9.5	31.3	37.8		8.5	37 9.0	17.4		9.3	19 57.8	40.1	A	9.5	54 28.6	6.8	
9.1	59 41.9	35.3		8.5	50 47.0	27.0		8.2	38 28.4	19.3		9.5	58.4	9.6		8.8	55 10.7	2.8	A
9.5	1 30.7	11.8		8.8	48.2	30.4		9.3	40 26.2	33.1		9.3	21 8.5	27.7	A	9.5	21.0	13.6	
8.9	2 11.6	13.8		9.5	51 35.0	15.2		9.5	56.4	39.0		9.2	51.7	28.9	A	9.5	55.2	8.6	
8.9	4 7.8	1.5		9.5	37.1	9.3		9.3	41 0.7	45.1	B	9.2	56.3	55.0		9.3	57 6.6	59.4	A
9.5	58.3	31.0		9.1	52 39.4	8.5	B	9.3	9.8	32.1		9.3	22 9.3	28.8	A	8.5	42.5	9.6	A
9.4	5 39.3	54.4	A	6.6	53 2.2	19.9	G	9.4	11.2	12.3	B	9.4	26.0	16.4	A	7.7	58 9.1	31.7	A
7.6	7 59.1	36.0	B	9.5	28.7	16.2		9.3	43.9	44.2		9.4	23 34.3	23.3	A	9.5	21.8	40.7	
9.5	8 55.5	38.0		9.5	54 58.8	11.4		9.5	42 28.4	9.5		8.2	24 22.2	9.7	A	9.5	1 27.8	2.3	
9.5	11 4.8	37.3		7.8	57 33.6	20.8	S	9.1	43 31.4	30.5		9.0	45.1	52.2	B	9.5	2 38.6	27.9	
9.5	16.7	49.0		9.0	37.9	46.2		9.3	38.4	29.0		9.5	46.3	44.1		9.3	47.7	39.2	A
8.8	54.5	58.8		9.5	59 38.0	34.5		9.5	49.9	13.6		9.5	25 14.0	40.6		9.4	49.5	18.0	
6.8	14 54.4	19.2	F	6.3	0 32.8	48.1	J	8.6	44 41.4	56.0	R	9.4	26.4	54.2		9.3	5 18.6	15.6	B
6.8	15 21.6	2.0	F	7.2	1 3.3	29.0		9.2	43.5	59.9		9.5	26 3.8	44.6		9.5	6 19.4	51.0	
9.3	16 17.5	49.5		8.4	36.7	45.7		9.4	45 8.6	1.8		8.0	35.7	9.2	A	8.5	7 25.6	43.6	S
9.5	40.2	1.0		9.5	3 16.0	26.5	B	9.0	28.7	13.6	B	9.5	27 9.8	34.8		9.5	8 8.5	50.7	
9.2	17 0.0	32.9		9.5	6 11.5	1.6		9.5	39.0	30.8		9.0	23.3	57.9	A	9.5	36.2	16.9	
9.2	47.5	2.6		9.5	12.3	34.2	B	8.8	46 40.1	46.0	J	9.5	28 2.9	43.6		9.3	36.9	8.2	
9.2	18 0.6	12.6		8.5	7 32.9	40.1		7.8	41.5	45.2	J	8.2	5.8	48.5	A	9.2	9 59.0	28.1	
9.1	11.3	50.0		7.5	8 50.2	49.1	B	8.7	47 4.2	15.1	A	9.5	29 57.5	30.6		8.3	13 24.1	46.3	A
9.5	11.5	41.1		9.5	10 3.3	26.1		9.5	12.8	7.3	A	9.5	30 24.0	17.1		8.7	35.8	50.9	A
9.3	56.4	10.1		9.2	16.0	0.2		9.5	24.7	19.5	A	9.5	44.8	29.4		9.3	14 29.0	54.4	B
9.5	58.3	35.6		9.1	11 4.9	56.5		9.0	49 13.3	47.5	R	9.2	31 5.1	55.5	A	9.0	57.2	50.4	A
9.5	19 11.0	7.9		9.5	20.5	7.1		9.3	23.3	49.5		9.3	52.5	50.6		9.5	16 43.1	50.9	
9.5	15.0	5.1		9.5	21.7	49.6		8.0	37.4	33.3	A	9.4	32 14.7	18.4	B	9.3	56.7	25.8	A
9.0	45.6	17.8	A	9.3	12 0.8	25.8		9.5	51 14.5	30.4		8.3	34 46.3	36.4	L	8.5	18 12.6	58.3	A
8.5	20 35.9	11.8	A	9.2	5.9	31.4		9.4	43.3	16.1	B	9.0	35 34.1	14.7		9.5	59.4	7.2	
9.4	44.1	8.0		9.4	31.0	38.5		8.1	55 6.5	43.9	A	8.5	37 29.6	43.6		9.4	19 4.9	12.5	
8.8	47.8	22.4	A	9.3	14 28.2	51.7	B	9.4	13.6	51.1		8.3	37.2	12.7		9.1	49.1	48.5	A
3.0	21 43.8	28.1	A	9.5	45.3	48.2		9.3	56 53.2	12.9		9.5	38 32.0	44.6		9.5	20 8.3	19.8	
8.3	22 4.5	31.0	A	9.5	46.0	46.7		9.3	57 23.9	40.5	B	9.5	49.3	39.7		9.4	21 31.2	23.1	
9.5	24 28.2	18.3		9.0	16 24.3	38.0	A	9.5	32.4	30.2		9.5	39 43.2	20.0		9.4	22 3.0	47.0	
9.5	26 58.5	43.0		9.1	18 10.6	24.8		9.5	58 5.7	15.4		9.5	40 46.0	30.1		9.2	24 42.5	13.5	A
9.4	27 42.4	30.3		9.5	19 40.5	22.8		9.4	59 3.9	26.0	B	9.2	41 28.6	54.5	B	7.2	43.8	37.7	A
9.2	28 7.1	37.9		9.5	49.5	25.2		9.3	0 10.4	29.1	B	9.5	42 18.0	33.7		6.2	25 42.7	27.4	A
9.5	29 7.9	18.2		9.2	20 26.9	45.7		9.5	14.0	38.8		8.3	43 3.8	54.0	A	9.5	51.6	28.8	

1901—1960				1961—2020				2021—2080				2081—2140				2141—2200			
	18h—19h	+59°			19h	+59°			19h	+59°			19h	+59°			19h—20h	+59°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.1	27 39.5	28.1		9.5	9 0.2	5.0		9.5	21 0.4	6.8		9.1	34 54.3	26.6		7.7	52 29.2	4.6	J
9.3	28 35.0	0.2		9.5	20.9	3.4		9.5	23.4	10.9		9.5	59.2	3.8		9.5	30.6	27.7	
8.7	29 23.6	28.0	G	9.1	26.5	13.9		9.1	26.3	18.2		8.8	35 9.1	24.2		9.5	35.3	27.9	
7.7	52.2	20.2	G	8.8	10 1.8	2.7		9.4	33.7	16.3		9.5	24.6	7.6		8.2	52.5	59.9	B
9.0	30 43.7	12.5		9.3	8.1	58.8		8.3	56.7	34.6	R	9.5	52.7	51.5		8.0	57.7	21.3	B
9.0	31 4.6	47.0		9.5	21.4	11.2		9.5	22 16.4	17.8		9.5	36 1.4	6.7		9.5	53 35.2	56.5	
8.8	32 56.9	8.5		9.5	34.4	28.8		9.0	17.5	56.2		9.5	6.7	39.5	B	9.2	40.6	50.4	
8.5	35 44.8	38.6		9.5	48.1	58.7		9.1	20.2	6.8		9.2	21.1	24.6	R	8.1	42.6	23.7	B
8.8	36 15.3	7.4	B	9.2	58.8	3.9	B	9.2	25.1	12.2		9.5	39.5	2.4		8.7	43.9	20.7	
9.3	46.5	10.5	A	9.5	11 11.7	51.5		8.2	48.4	28.8	R	7.9	59.5	0.7	B	9.1	57.5	30.6	
7.0	37 17.5	23.6	B	9.3	12.9	55.5		9.2	23 47.8	53.5		9.5	37 23.5	25.5		8.3	54 3.9	36.0	
9.5	38 37.1	44.5		9.5	32.0	5.0		7.8	59.2	8.2	F	7.0	32.5	30.3	G	7.4	5.3	53.8	R
9.4	39 4.5	25.8	A	8.8	44.9	21.2		8.6	24 6.1	23.0		9.5	38 4.6	33.0		9.2	52.0	40.2	
9.5	40 33.0	11.5		7.2	45.8	17.3	F	9.4	11.3	27.8		9.5	5.4	28.5		9.4	55 15.7	17.4	
8.9	41 10.6	25.7	A	9.5	59.5	48.4		9.5	26 1.4	11.3		8.8	11.0	22.4		8.6	56.9	38.2	
9.4	15.6	32.7		6.7	12 4.6	26.1	F	9.5	7.6	15.1		9.5	16.6	7.3		8.1	56 15.0	7.4	B
9.5	41.3	17.0		9.2	10.3	9.0		9.4	12.3	44.1		9.3	27.6	9.9	B	9.2	30.7	50.7	
8.7	43 1.7	17.0		8.5	18.7	33.6		7.7	20.3	28.0	F	9.5	49.3	30.5		9.0	42.5	7.2	B
7.8	48.9	24.1	F	8.9	29.5	30.8		9.3	28.3	7.2	B	8.9	54.8	54.1		8.5	52.3	3.4	S
9.3	49.1	14.3		9.5	48.0	40.6		9.5	34.5	12.5		8.3	39 44.5	30.3		8.5	53.4	20.8	
7.3	44 0.9	31.6	A	8.3	57.5	31.3		9.5	27 0.4	46.8		9.5	40 3.1	6.1		9.3	57 16.9	37.5	
8.0	50.0	9.0	S	8.2	13 6.9	26.7	B	8.3	8.8	54.0	R	9.5	6.9	29.6		9.2	24.8	7.0	
9.5	47 2.1	54.4		9.1	9.3	9.8		8.9	12.1	4.2	A	8.8	46.4	8.3	B	9.5	53.7	3.6	
9.3	38.1	40.1		9.4	22.7	34.1		9.1	26.5	30.8		9.2	47.2	3.2		9.1	58 23.3	27.5	
4.3	49 3.7	13.0	S	9.5	35.9	54.8		9.2	29.1	41.1		9.4	56.2	18.3		9.5	46.7	16.2	
7.3	50 0.2	29.6	F	9.5	43.5	13.2		8.7	38.1	40.6		9.4	41 26.2	8.8		9.2	59 1.6	17.7	
9.5	56.3	22.7		9.5	51.0	56.6		8.7	28 1.7	42.7	B	9.4	31.4	29.2		9.0	22.7	33.2	
9.5	51 33.0	7.1		8.9	51.2	43.1		8.5	12.8	18.3	A	9.5	44.2	43.7		7.5	0 18.2	14.6	B
7.0	44.7	50.3	F	9.2	14 1.9	37.9		9.2	16.0	39.0		9.4	42 2.3	27.7		9.1	24.3	46.4	
9.5	53 25.6	31.2		9.5	17.6	41.5		9.2	22.6	15.7	A	8.3	27.0	21.6	A	9.5	1 19.2	22.0	
9.5	55 32.4	47.7		9.4	19.2	28.4	B	9.1	31.1	5.7	A	9.0	31.2	26.3		7.8	24.9	15.0	B
9.2	37.0	33.1		9.4	47.2	28.4	B	8.9	33.3	35.4	R	9.5	42.0	46.9		9.5	39.7	28.9	
9.5	56 3.5	25.3		8.1	59.4	12.8	B	9.0	29 11.2	26.2		9.2	43 3.7	16.9		9.4	2 44.3	27.0	
9.2	57 12.8	17.8		8.1	15 11.0	6.0	B	9.3	17.6	6.3		9.5	7.8	7.2		9.3	55.8	0.0	B
9.3	37.0	26.3		8.7	15.7	16.2		8.2	30 11.1	58.8	B	9.4	18.8	35.8		9.2	3 0.7	0.0	B
9.0	59 21.7	51.3		6.7	36.7	34.5	F	9.2	28.1	23.9		9.5	20.5	48.1		9.5	21.5	22.0	
7.0	0 4.0	54.7	G	9.0	46.9	54.3		8.9	31.2	7.8	A	9.1	44 24.7	51.2		9.5	25.8	15.0	
9.2	7.1	42.2		9.2	49.8	19.5		7.4	42.6	4.7	A	9.5	46.8	53.5		9.4	28.3	4.7	
9.0	25.7	54.4		8.8	16 15.2	8.9		8.5	43.7	51.5	A	8.8	45 1.1	2.5	A	8.7	55.4	2.8	A
9.5	44.0	20.3		9.5	39.6	32.2		6.2	52.7	50.9	A	9.4	39.3	28.2		8.5	4 39.1	51.8	A
8.2	55.6	13.8	B	9.4	17 3.3	27.7		9.2	31 14.2	43.1	R	6.5	41.2	3.3	A	8.4	5 22.2	49.8	A
9.5	1 19.5	39.2		9.4	38.1	58.7		9.5	19.5	41.7	B	9.5	48.4	1.3		9.5	6 1.9	0.8	
9.4	35.6	20.8		9.5	42.5	6.9		9.5	32.5	31.0		8.5	46 27.5	26.5		9.2	13.3	49.3	
9.0	2 12.7	50.1		8.3	18 7.2	57.0	B	9.0	41.0	57.0	A	9.5	48.6	56.2		9.5	33.4	8.5	
9.5	53.5	1.9		9.5	13.8	53.0		8.0	41.5	57.5	A	9.2	47 42.3	6.9		7.5	54.7	58.8	A
9.1	3 1.0	31.2		9.5	39.3	9.7		8.5	54.3	45.2	A	9.0	50.9	21.0		9.5	54.7	18.9	
7.4	36.5	4.0	B	9.5	19 3.9	37.0		9.5	32 5.3	10.7		9.5	48 9.8	53.3		9.4	7 58.9	52.1	B
8.8	44.3	38.7		9.0	4.1	58.0		9.4	41.6	54.6	B	9.5	48.4	45.5		9.5	8 8.1	22.0	
7.3	54.1	52.4	A	9.4	5.7	50.1		9.4	43.0	22.3		9.0	49.7	19.8	B	9.0	15.2	30.4	A
9.4	4 23.9	55.6		9.2	8.2	26.3		9.4	47.0	39.2		9.5	49 33.2	25.8		9.5	40.0	31.2	
9.5	5 8.0	38.2		8.4	8.5	14.0	A	9.5	58.8	56.4		9.5	50.8	18.6		9.5	9 0.0	28.7	
9.5	6 8.2	26.5		9.5	9.8	43.5		8.8	33 11.6	31.7		9.5	50 2.2	3.3		9.5	0.8	26.7	
9.4	30.9	38.3		9.0	20 3.2	51.6	A	9.5	20.0	38.7		9.5	7.2	26.0		6.5	9.3	15.2	B
9.2	42.0	39.7		9.0	5.8	52.8	A	9.3	21.2	42.9		9.0	46.8	3.9		7.5	14.2	11.4	B
9.5	57.8	52.6		9.0	13.6	50.4		8.8	22.5	29.5		9.1	58.2	25.7		7.4	19.8	42.8	B
9.0	7 23.1	4.7		9.4	14.7	16.8		8.5	41.2	59.1	A	9.0	59.1	21.1		8.2	29.9	53.3	R
9.4	24.8	53.8		8.9	26.0	44.3	B	9.4	59.8	35.8		5.8	59.1	19.4	J	9.1	54.7	29.9	
9.2	42.0	13.9		8.8	27.7	52.0		9.5	34 10.0	57.6		9.5	51 51.8	36.2		9.2	57.1	24.0	
9.0	8 11.6	6.2		9.4	54.2	45.0		9.0	36.5	31.5	R	9.4	55.1	41.4		9.0	10 9.7	28.0	
9.5	20.0	39.2		9.1	58.1	58.8		9.2	44.1	22.9		6.5	52 14.5	13.6	J	8.3	10.3	56.8	R

2201—2260			
	20ᵘ	+59°	
m	′ ″	′	
9.0	10 16.0	50.9	
9.3	28.9	39.9	
9.3	57.9	39.3	
9.3	11 20.8	11.5	
9.0	50.5	14.1	
8.5	56.5	10.5	
9.3	12 15.3	54.4	
9.0	20.9	26.2	
8.8	13 11.9	19.0	
9.0	21.1	40.4	
8.3	14 39.3	17.0	
8.3	50.2	51.3	R
8.9	58.0	20.5	
9.0	15 53.6	45.9	
8.9	58.4	2.2	
9.0	16 4.3	2.4	
9.5	11.8	58.9	
9.5	17 10.9	41.4	
9.4	14.5	7.2	
8.5	54.4	58.4	A
9.4	19 31.7	7.6	
8.4	20 17.2	18.5	F
9.0	38.8	1.4	R
8.0	21 34.0	49.0	A
9.4	34.3	39.6	
8.6	36.4	36.3	
8.0	58.4	52.3	A
6.4	22 3.9	7.6	A
9.1	4.7	17.3	B
8.3	18.2	56.9	A
7.5	20.2	31.7	A
8.6	23.8	59.5	A
9.4	25.8	19.4	
7.3	45.9	41.6	A
9.5	52.1	9.5	
8.4	23 0.8	31.6	A
9.5	25.6	37.1	
9.4	24 15.3	28.7	
9.3	42.2	44.6	A
7.4	25 0.5	15.3	A
9.5	8.4	51.9	
8.0	28.3	45.6	A
9.2	49.4	9.0	
9.5	26 8.8	4.9	
9.0	15.8	16.4	A
7.8	23.5	55.9	A
9.5	30.0	31.2	
9.5	34.2	51.0	
9.5	52.0	48.4	
9.5	27 35.0	48.7	
8.0	58.8	23.2	A
8.0	28 14.8	14.8	A
9.4	22.7	29.7	B
7.5	51.8	34.6	A
9.4	52.3	40.7	
9.5	29 0.4	49.3	
6.8	6.6	56.9	G
9.5	31.3	48.0	
9.2	30 1.9	6.0	B
9.5	18.3	24.2	

2261—2320			
	20ᵘ—21ᵘ	+59°	
m	′ ″	′	
9.5	31 11.3	15.8	
9.5	29.8	46.0	
9.3	32 33.9	18.9	
8.7	59.6	10.2	
9.4	33 28.0	54.9	
9.5	35 28.3	24.7	
9.2	36 14.3	19.4	
9.0	20.1	3.9	A
9.3	20.8	3.5	B
8.0	42.9	11.1	A
9.1	45.9	51.0	
6.2	37 12.9	59.5	A
9.5	49.8	51.0	
9.5	38 16.6	41.2	
9.4	21.1	28.0	
9.0	56.3	14.9	
9.5	40 32.8	3.7	
9.4	41.8	57.2	
9.4	41 11.5	53.4	
8.7	14.6	49.8	B
9.5	42 0.9	47.1	
9.5	47.3	1.7	
8.2	43 20.6	19.9	B
9.4	47.6	31.6	
7.9	51.6	34.0	B
9.5	45 44.6	15.0	
9.5	47 12.3	7.7	
9.4	24.9	19.3	
9.4	48.9	18.8	
9.1	48 39.5	50.1	A
8.0	46.2	50.0	A
9.0	58.4	49.2	B
9.0	49 38.8	23.2	
9.3	51 0.1	24.6	
9.4	16.0	59.0	
7.5	52 11.6	28.0	A
9.4	55.7	45.9	
9.0	53 26.5	1.1	A
9.4	46.1	1.0	
9.1	54 0.4	13.2	B
9.3	10.2	20.4	
9.2	35.0	27.2	
9.4	39.2	37.9	B
9.4	59.9	25.1	
8.9	55 20.3	56.1	
9.1	56 10.3	16.7	
9.5	57 38.6	18.7	
9.3	59.1	47.7	
9.0	58 54.0	40.5	A
8.8	59 8.1	28.1	A
9.5	36.9	1.7	B
8.8	0 0.6	35.6	
7.0	1 6.8	40.4	A
9.2	42.0	11.6	
8.8	2 2.4	54.2	
9.1	26.6	30.6	
9.3	35.1	5.4	
9.3	57.8	13.7	
8.8	3 8.4	4.8	
7.5	20.2	17.7	A

2321—2380			
	21ᵘ	+59°	
m	′ ″	′	
9.5	3 27.0	51.7	
8.7	44.1	57.5	A
9.4	4 58.6	42.0	B
9.4	5 18.8	9.7	
9.5	6 13.4	13.2	
9.0	44.0	52.2	
8.2	46.3	36.5	A
9.5	47.3	39.9	B
9.5	50.9	40.4	
9.1	7 15.1	28.6	
8.8	21.4	38.5	A
9.3	41.2	19.7	A
8.5	58.0	21.9	A
6.0	8 8.8	22.1	A
9.5	11.2	55.7	
9.4	11.8	24.2	B
8.8	15.6	6.5	B
9.4	16.9	10.7	
9.5	35.1	47.9	
9.4	37.0	56.8	
9.3	9 1.4	56.0	B
7.5	9.0	31.3	A
9.4	43.7	58.5	
8.5	10 59.9	10.0	R
9.5	11 15.6	50.4	
8.6	23.4	59.2	A
8.6	13 20.1	41.0	A
9.0	27.3	4.8	
9.3	33.3	22.8	B
9.2	44.6	29.1	A
9.4	53.5	57.2	
8.9	14 50.1	50.9	B
9.4	54.1	38.0	
8.3	15 3.9	1.0	
9.5	24.6	14.6	
9.0	29.7	21.2	A
9.0	16 35.1	55.3	
9.5	47.2	20.7	
8.5	48.3	49.8	A
8.9	17 17.2	31.9	B
8.8	34.8	38.8	
7.7	47.3	57.5	A
9.3	48.7	48.9	
9.3	18 30.6	46.5	
9.2	35.4	38.7	
9.2	49.9	45.9	
9.5	19 34.5	40.7	
9.0	38.9	13.7	A
9.4	41.0	57.2	
9.3	49.3	37.9	B
8.6	20 17.6	8.4	A
9.2	26.1	7.5	
9.4	47.0	16.7	
8.9	21 15.8	40.0	A
9.3	49.6	19.7	
9.0	56.2	27.1	A
9.0	22 5.2	31.5	A
9.4	17.0	13.8	B
9.3	23 1.1	42.0	B
8.7	14.2	55.8	A

2381—2440			
	21ᵘ	+59°	
m	′ ″	′	
9.0	23 17.6	15.7	
9.5	18.4	46.0	
6.4	26.0	7.4	G
8.8	24 28.4	36.5	A
9.2	25 2.1	11.6	
9.5	37.1	8.3	
7.3	49.6	44.4	A
9.5	26 7.7	35.0	
9.5	16.7	28.6	
8.9	19.4	50.7	A
9.2	21.9	6.6	B
9.3	33.6	16.7	
8.8	43.5	44.4	A
9.4	49.7	37.0	
5.7	27 1.4	49.4	A
7.2	29 36.2	40.5	A
9.5	34.9	58.2	
8.6	55.9	50.8	A
8.5	30 41.2	2.1	A
9.5	31 14.9	21.7	
9.5	32 9.4	53.8	
9.5	20.0	17.2	
9.3	47.4	20.7	
8.9	57.4	15.7	A
9.5	33 0.9	49.8	
9.5	33.5	39.5	
9.5	35 8.9	36.5	
9.4	36 5.4	45.1	A
6.9	17.9	5.7	A
9.3	49.8	35.2	B
9.5	38 2.9	7.3	
9.0	32.9	38.0	
9.4	55.4	57.8	
9.5	40 13.5	23.6	
8.9	18.5	3.3	
9.0	41 18.2	50.8	
9.4	30.0	22.6	
9.3	42 36.3	56.8	
9.0	58.1	7.9	
7.0	43 14.6	1.8	A
9.4	46.3	10.6	B
9.4	44 9.3	53.5	
9.4	45 32.4	31.6	
7.8	45.9	29.6	A
9.0	47 6.9	46.3	
9.5	18.4	59.2	
7.7	20.9	15.0	B
7.8	48 0.8	38.5	P
9.5	13.9	24.6	
7.7	37.6	57.2	A
9.0	47.2	42.9	
8.6	50 40.4	17.5	
9.5	51 0.3	56.2	
9.5	3.9	58.8	
7.7	24.2	8.3	A
7.0	54.6	6.3	A
8.6	52 4.0	18.7	A
9.5	26.8	29.6	
9.3	55.0	20.5	B
9.4	53 28.2	16.2	

2441—2500			
	21ᵘ—22ᵘ	+59°	
m	′ ″	′	
9.2	54 18.0	16.2	
7.8	26.9	22.1	A
7.5	43.9	37.0	A
9.2	55 0.6	3.1	
7.9	14.9	51.1	A
8.8	45.8	45.7	A
9.2	48.4	55.2	
8.6	56 52.5	52.9	A
9.5	57 7.7	19.8	
8.4	32.4	32.3	A
9.4	42.5	11.7	
8.9	58 25.3	27.3	A
9.5	30.7	13.7	
8.7	44.8	29.5	A
9.2	59.8	40.6	
6.6	59 11.6	6.6	A
9.3	17.3	7.9	B
9.4	19.0	26.9	
6.8	29.7	9.9	A
8.1	32.4	51.6	A
7.9	33.3	7.7	B
9.1	42.5	21.7	
8.0	42.8	13.0	A
8.5	0 6.4	1.3	A
8.2	1 51.4	57.5	A
8.6	2 21.3	55.0	A
9.0	28.0	32.6	A
8.9	28.4	29.7	A
9.2	34.6	27.1	
8.5	54.2	58.8	A
9.5	4 6.0	25.6	
9.5	17.7	28.8	
9.2	22.5	37.1	
9.5	56.2	27.7	
8.0	5 11.0	58.8	R
9.3	12.2	13.4	
8.3	23.4	19.4	B
9.4	28.1	13.5	
9.4	35.1	13.5	
9.5	42.3	54.3	B
9.0	6 52.6	17.5	
7.6	55.2	0.2	S
9.5	57.2	34.3	
9.5	7 4.4	59.8	B
7.6	11.1	22.5	B
8.9	36.6	45.1	
9.3	41.8	31.1	
8.8	52.9	30.1	B
9.5	8 0.9	46.8	
9.5	17.2	34.2	
9.4	23.5	16.0	
9.5	35.9	50.2	
9.3	42.6	30.7	A
9.5	9 20.5	15.3	
9.0	37.5	5.4	
9.5	42.3	16.7	
9.5	56.8	54.1	
9.2	10 18.1	9.2	
9.5	50.2	49.9	
9.3	11 55.6	51.2	

2501—2560				2561—2620				2621—2680				2681—2740				2741—2800			
	22u				22u				22u—23u				23u				23u		
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	12 16.5	41.0		8.0	36 38.3	9.9	A	9.5	55 2.8	58.3		9.5	8 50.4	6.4		9.5	25 33.8	44.4	
9.5	51.4	23.4		9.2	38 0.9	21.5		9.5	21.8	56.9		9.5	52.4	37.7		9.5	26 6.6	38.0	
9.2	53.2	54.0		9.0	28.4	43.2		9.1	29.4	38.8		9.0	56.9	39.5		9.0	14.9	48.3	A
9.2	59.0	24.9		9.1	39 29.0	7.4		8.8	34.5	54.6		9.2	9 23.1	8.0		7.7	37.0	37.4	F
9.2	13 29.6	25.9		9.3	32.5	4.8		7.3	43.3	25.0	G	8.4	26.2	53.1		7.0	53.0	14.5	F
6.8	14 25.1	25.2	B	9.5	55.3	20.0		8.8	44.6	44.3		9.1	39.0	25.5		7.6	53.0	38.9	F
9.5	15 6.1	38.8		9.5	40 27.1	51.4		9.5	56 4.4	2.1		9.0	40.0	21.7		9.5	53.1	47.8	
8.8	32.0	8.7		8.0	41 18.9	51.5	A	9.2	13.6	10.9	B	9.2	41.4	31.2		9.5	27 3.5	39.1	
8.0	38.3	21.4	A	8.0	24.7	59.4	A	7.0	24.5	4.5	G	9.5	10 17.1	6.6		9.4	30 40.3	34.4	
9.5	42.4	19.3		9.5	52.7	8.0		9.2	57 19.8	39.9	B	9.1	38.3	9.8		9.5	51.3	18.5	
9.0	17 6.8	14.6	A	9.5	56.7	0.6		6.7	25.4	39.9	G	9.5	50.0	10.5		8.8	50.0	34.9	
9.5	18 22.9	30.4		8.5	42 19.1	22.2		9.5	36.9	12.4		9.3	11 7.3	27.6		9.1	57.9	55.0	
9.5	19 0.9	55.8		9.0	54.2	49.4	A	9.5	39.3	3.4		8.6	18.5	51.8		9.0	31 5.0	2.1	
8.5	9.0	33.3	A	9.2	43 3.1	18.8		9.5	48.7	23.0		8.4	38.4	52.1		9.5	32 24.1	29.5	
9.4	21.7	18.5		8.5	13.7	35.7	A	9.1	55.8	17.8		8.7	43.9	4.5		9.5	26.3	5.1	
8.3	27.5	29.1	A	9.5	22.9	12.8		9.0	58 7.2	18.2		9.0	52.0	21.4		9.0	33 13.5	27.0	
9.4	21 13.9	9.2		9.5	49.4	29.9		8.5	8.2	43.0		8.8	53.5	51.3		9.5	34.5	41.4	
9.3	41.4	26.9	R	9.5	44 21.3	54.5		9.5	27.3	35.4		8.7	58.9	29.3		9.4	48.8	23.5	
9.2	47.6	10.2		9.2	53.1	30.9		9.4	59 23.5	34.2		8.6	12 39.1	38.3		9.5	34 34.5	6.4	
9.5	22 4.0	19.6		9.4	55.4	4.7		9.5	30.0	6.7		9.0	13 16.2	47.8		9.0	35 1.7	4.3	
8.8	14.9	28.9	R	9.4	45 2.8	13.1		9.3	0 29.9	9.6		6.7	57.5	28.6	G	9.0	36 14.0	8.2	
9.5	36.0	0.3		9.5	5.9	13.7		9.3	43.1	52.4		9.2	14 5.9	39.0		8.6	36.5	8.9	
9.3	50.0	5.7		9.1	9.0	14.3	B	9.5	1 12.2	35.0		7.5	43.9	40.4	A	9.5	38 26.6	35.4	
8.8	23 18.4	13.5		9.4	22.8	43.9		9.3	28.9	41.9		9.2	50.2	47.3		9.4	29.6	21.2	
8.3	49.4	55.5	R	9.4	38.4	48.9		9.2	41.5	49.0		9.5	50.6	57.1		9.4	36.3	6.9	
8.5	59.0	4.9	A	9.0	54.3	0.0		9.5	2 3.6	32.5		8.7	52.7	50.6	A	9.0	47.3	24.7	B
9.0	24 29.0	38.3	B	9.3	46 13.7	37.2		9.0	19.6	30.1		9.4	15 40.4	34.0		9.5	39 3.5	25.2	
9.5	31.7	41.3		9.3	27.5	39.8		9.5	29.8	27.8		9.2	45.0	37.9		9.1	7.0	40.7	
8.4	48.4	14.5	A	9.5	48.6	44.6		9.5	32.5	31.7		9.5	16 3.8	4.5		7.0	8.0	40.0	S
8.4	25 6.0	53.9	B	9.5	57.9	53.7		8.5	52.9	22.4		6.0	6.1	20.0	A	9.4	44.8	4.9	
9.5	30.1	55.8		9.4	47 1.2	39.2		9.4	3 7.0	22.4		9.4	10.6	53.6		9.4	45.4	54.9	
9.1	32.3	56.2	B	9.5	8.2	4.7		9.5	9.1	2.3		8.7	17 10.6	40.5	A	9.5	40 7.3	53.0	
9.2	46.8	40.7	R	9.1	11.0	58.0		9.1	14.8	22.6		9.5	18 10.2	22.1		8.5	9.8	30.4	
9.0	26 34.2	58.8	A	9.5	13.5	26.4		9.1	30.9	10.8		9.5	10.2	13.7		9.5	25.0	56.9	
9.1	40.7	56.4	A	6.3	17.1	19.7	A	8.9	34.2	64.5		9.1	13.2	17.1		9.3	41 26.8	29.0	
8.0	27 5.9	35.4	A	9.5	50.4	21.2		9.5	50.8	6.7		9.1	15.0	24.2		9.3	33.0	41.4	
9.5	46.7	6.7		9.1	48 27.9	53.6		9.5	57.2	35.4		9.1	20.6	31.5	B	6.5	49.3	10.5	R
9.5	28 12.2	22.0		9.5	35.2	32.7		9.3	4 5.9	29.7		9.3	21.1	32.7		9.1	42 8.5	8.1	
9.5	32.4	50.7		9.2	52.5	54.7		9.5	25.0	7.8		9.5	54.4	51.6		9.5	26.1	57.3	
9.5	59.3	50.2		9.5	49 10.0	2.4		8.1	25.1	38.1	B	9.5	19 4.0	16.4		9.5	44 33.6	39.4	
9.5	29 5.9	44.8		9.5	19.6	20.3		8.8	40.4	25.6		9.3	10.2	55.5		9.5	44.0	35.4	
9.5	16.7	56.8		9.2	59.5	14.2	B	8.9	41.2	20.8		9.5	27.4	26.3		9.5	54.7	7.2	
8.8	26.2	12.8		9.5	50 15.3	10.7		9.0	44.5	11.1		9.5	51.4	50.3		9.0	45 3.6	26.5	
9.5	26.4	27.7		9.3	15.3	11.4		9.5	5 4.9	48.0		8.7	20 11.6	35.5		6.8	55.7	53.6	G
9.5	44.4	27.5	B	9.2	23.2	55.0		9.5	30.7	9.1		9.5	21.2	30.6		9.5	46 18.5	52.3	
8.4	30 2.3	13.4		9.5	59.0	55.0		9.5	41.2	5.4		9.5	30.0	7.0		9.3	45.0	34.1	B
9.5	45.1	39.3		7.3	51 2.8	11.3	G	9.5	57.6	6.9		9.3	53.9	37.9		9.5	47 33.0	35.9	
9.5	31 11.9	22.0		9.5	30.4	57.6		8.4	6 2.4	52.8	A	8.8	21 0.4	47.0		9.0	39.1	44.4	
9.5	18.0	23.0		9.5	57.6	58.1		9.2	11.1	38.5		7.6	35.7	15.6	B	9.4	48 5.0	59.2	A
9.5	46.4	57.5		9.4	52 4.4	5.3		8.2	28.6	55.9	A	9.5	22 23.0	27.4		8.7	49 0.2	29.3	
9.0	32 31.0	49.0		9.5	10.8	14.9		9.5	49.7	34.1		9.4	25.7	43.6		9.4	36.0	32.9	
8.2	40.8	52.6	R	9.5	28.3	37.2		9.4	7 12.9	34.5		9.5	29.9	9.0		9.4	53.1	50.[illegible]	
9.5	50.1	13.0		9.1	41.6	32.8		8.5	44.8	1.2		9.5	58.4	20.4		9.0	59.1	[illegible]	
9.5	33 36.9	45.8		8.8	44.0	15.1		9.5	57.7	35.4		9.5	23 4.1	32.4		9.1	50 14.1	[illegible]	
8.9	35 7.5	55.9		6.5	53 13.5	2.5	G	9.5	8 0.0	40.3		9.4	26.6	3.6		6.7	18.2	[illegible]	
8.5	8.9	32.3	A	9.1	23.0	22.4		9.0	10.5	59.0		9.2	57.5	41.9		9.3	21.9	[illegible]	
9.5	45.4	31.4		9.1	45.7	35.1		9.2	17.3	3.1		9.5	24 22.5	33.4		8.2	51 12.[illegible]	[illegible]	
9.2	53.0	13.5		8.8	54 55.5	25.8		9.1	36.9	57.6	B	9.5	29.8	27.5		9.5	[illegible]	[illegible]	
9.2	55.6	21.5		9.5	59.6	19.8		9.5	38.9	56.9		9.3	54.3	52.7		9.2	[illegible]		
8.5	36 18.8	2.9	A	9.5	55 2.3	31.0		9.3	46.5	19.1		9.0	25 4.0	44.4	A	9.4			

2801—2807				2808—2813				2814—2819				2820—2825				2826—2831			
	23h		+59°		23h		+59°		23h		+59°		23h		+59°		23h		+59°
m	′	″	′		′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.5	51	56.0	13.8	A	9.5	53	10.5	36.0	B	8.7	54	38.9	7.8	A	9.4	55	26.3	10.9	A	9.5	58	11.2	28.2
9.2	52	14.3	7.6	A	9.4		41.3	34.9		9.0		48.6	8.9	A	9.4		51.1	10.0	A	9.5		42.7	29.8
8.5		24.0	30.4	A	7.8		54.0	33.1	A	7.5		55.3	53.6	A	9.5	56	13.0	11.8	R	8.4		50.0	39.0	A
8.9		26.9	16.8	A	9.4		54.1	43.4		9.5		56.0	42.7	A	9.3		26.5	51.4	A	9.5	59	16.1	48.9
9.3		49.7	0.4	B	8.6	54	0.0	32.4	A	9.0	55	13.5	1.2	B	8.7		49.1	21.5	A	9.4		39.4	11.0
9.0		57.6	32.9	A	9.0		16.2	39.4	A	9.3		20.6	9.6	A	9.5	57	36.4	24.5		9.5		58.0	19.5
9.5	53	3.2	36.9																				

Zone +60°

1—40				41—80				81—120				121—160				161—200			
	0h		+60°		0h		+60°		0h		+60°		0h		+60°		0h—1h		+60°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.5	1	50.8	34.4	9.5	14	21.3	56.1	9.5	32	32.3	2.2	9.4	43	10.0	51.2	9.5	56	18.4	55.2
9.5	2	40.9	21.6	9.3		27.2	51.1	9.2		49.8	48.7	9.1	44	2.7	56.6	A	8.3	53.2	0.2	A
9.5	3	4.4	43.4	9.5	15	18.3	39.4	9.1	33	32.2	38.9	9.0		18.3	29.4	R	9.5	56.9	38.4	
9.2	4	1.3	57.4	9.4		55.1	1.8	9.5	34	45.9	59.0	5.0		28.2	19.1	A	9.3	58 25.0	26.1	
9.5		23.9	42.4	7.5	16	1.5	7.5	A	9.5		46.3	42.0	9.2		28.8	17.7	B	9.5	32.0	32.5	
9.5	5	6.5	59.4	9.3		4.0	2.7		9.4		52.4	57.7	8.8		29.3	50.6	A	9.2	56.9	35.4	
9.4		18.4	34.4	8.8		6.7	41.1	A	9.4	35	0.9	58.1	9.3	45	29.5	36.1		9.5	59 10.2	33.5	
9.4		53.3	22.6	9.3	17	35.9	0.5	A	9.5		2.8	59.9	9.1		48.6	26.5	R	9.5	40.4	59.0	
9.5	6	32.8	36.9	8.9	18	13.8	14.1	A	9.5		14.6	56.2	9.0	46	4.5	43.6	B	9.3	57.5	41.9	
9.5		48.4	47.3	8.8		19.2	44.8	A	9.5		20.6	52.0	8.5		18.3	52.8	A	7.8	0 26.8	46.2	B
9.4	7	0.8	20.6	9.3		33.4	37.4	R	9.5		24.0	57.0	9.1		20.0	51.1		9.1	29.4	36.3	
9.0		11.5	38.4	9.0	18	0.3	21.9	A	8.5		27.3	28.9	A	9.4	29.8	36.4		9.5	48.2	14.3	
9.0		23.9	58.4	9.4		3.7	13.6		9.0		33.2	13.3	B	9.0	35.9	28.9	R	9.5	53.7	39.7	
9.5		25.2	32.5	9.4		7.2	24.1		9.0	36	4.1	59.0		9.5	47 27.6	59.1		9.4	1 20.9	23.6	
9.5	8	8.6	4.1	9.4		21.0	28.8		9.1		10.9	57.5		7.9	30.8	28.4	A	9.3	51.6	18.9	
6.9		11.9	12.2	A	9.1		33.3	35.4	R	9.5		57.8	34.4		8.5	48 20.3	46.8		9.3	53.3	37.5	
9.4		32.6	13.7		9.5	21	0.8	7.2		8.8	37	5.4	12.5	B	7.0	34.6	38.4	L	9.1	2 40.5	23.4	
9.5		48.0	31.5		9.5		5.7	12.1		9.3		16.5	11.5		9.5	49 21.5	46.6	B	9.5	51.9	57.4	
9.3		53.2	5.7		9.4		25.2	3.2		8.5		39.7	22.0	A	9.0	50 37.4	55.5		9.0	57.2	25.0	
9.5	9	7.0	19.6		9.0		48.1	22.7	B	9.1	38	4.2	43.8	A	9.2	51 10.9	21.9		9.4	3 5.5	32.9	
6.0		12.6	43.4	A	9.3	22	39.1	23.4	A	9.5		35.5	36.9		9.3	38.2	1.4	R	9.4	6.1	58.3	
9.2		42.3	51.5		9.5		42.2	53.4		9.5		38.5	34.9		9.2	52 31.2	0.8		9.5	17.2	38.3	
9.5		57.9	51.8		8.9		52.8	37.9	A	9.5		40.9	40.1		8.8	33.9	15.7	A	9.5	22.5	32.4	
9.5	10	20.0	7.0		9.3	23	34.0	20.5	A	9.5		49.5	38.9		9.5	53 1.4	25.0		9.5	52.9	2.2	
7.9		30.3	55.4	A	9.4	24	10.9	3.0	B	8.4	39	1.0	41.8	A	9.5	36.3	54.0		9.4	55.7	38.4	
8.9		38.8	5.8	B	9.5	25	14.5	36.5		8.8		15.3	32.4	A	8.5	42.9	48.4		6.6	58.7	56.1	A
9.3		42.2	36.1		9.4		17.0	36.0		8.1		51.5	47.5	A	9.4	46.2	0.6		9.5	4 10.5	9.4	
9.5		44.9	19.7		9.5		20.0	30.8		8.6		52.7	10.2	A	9.4	46.4	38.4		7.2	55.4	6.9	A
9.0		51.6	37.4	B	9.4		45.9	39.0		9.0	40	7.3	19.2		9.4	53.2	5.2		9.2	59.0	6.0	B
9.5	11	2.4	56.7		9.2	27	2.0	57.5	J	9.4		13.0	49.8		9.4	58.3	59.8		9.2	5 5.8	11.3	
9.2		25.8	4.2	B	8.5		36.4	40.3	A	9.2		13.7	14.8		9.2	54 1.8	19.1		9.4	19.1	33.9	
9.5	12	29.5	25.0		9.5	28	31.3	19.1		9.2		41.5	23.0	A	9.1	2.0	12.2	A	9.2	21.3	6.9	A
9.5		48.9	15.6		9.4		53.0	34.4		9.5	41	10.3	26.0		8.3	9.0	59.7	A	7.5	35.1	10.4	A
9.5	13	29.8	46.6		9.4		58.8	0.0		9.5		42.6	7.1		9.2	17.0	21.4	B	8.6	6 0.7	5.6	A
9.5		34.3	38.4		9.3	30	23.2	56.5		9.2	42	23.9	31.6	B	9.5	25.9	0.1		9.5	28.0	24.9	
9.4		39.5	18.6		9.2		58.3	58.0	B	9.3		43.8	30.7		9.1	39.3	25.6		9.5	54.2	15.9	
7.7		46.1	53.1	A	9.2	31	10.9	3.9	A	9.0		52.9	19.6	A	6.5	44.5	18.1	A	9.5	7 39.7	35.5	
8.8		52.9	16.6		8.2		18.8	53.5	A	9.4	43	6.3	39.9		6.0	55 25.9	48.8	A	8.6	48.8	53.4	R
9.1	14	0.2	55.5		9.1		48.1	3.1	A	9.5		8.4	4.2		9.5	55.7	24.5		9.4	8 6.9	30.8	
9.2		6.5	43.3	A	9.5	32	7.2	9.2		9.2		9.7	11.6	A	9.0	56.8	56.5	A	9.1	27.4	58.4	

201—260				261—320				321—380				381—440				441—500			
	1ᵘ	+60°			1ᵘ	+60°			1ᵘ	+60°			1ᵘ	+60°			1ᵘ—2ᵘ	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.0	8 49.0	57.5	A	8.7	22 57.4	22.8	B	8.6	34 29.8	33.8	A	9.5	46 1.1	7.0		9.1	59 33.0	50.9	
9.4	9 31.1	26.6		9.5	23 8.1	13.3		9.4	35 9.1	4.6		9.5	10.0	14.5		8.7	52.9	7.4	
9.0	35.9	48.3	A	9.5	11.4	5.1		9.5	11.3	19.7		7.3	15.7	34.0	A	8.3	0 15.3	16.1	
9.4	45.1	6.5		9.3	29.0	57.7		9.5	16.8	33.0		9.5	40.4	2.9		8.0	51.0	39.8	A
8.6	58.5	55.7	A	8.7	54.9	48.6	A	9.5	24.9	23.1		9.5	40.5	6.9		8.0	1 0.1	31.4	A
8.8	10 21.7	48.8	A	9.5	24 20.9	15.0		9.4	32.1	2.1		8.0	47.9	31.5	A	9.5	16.1	47.8	
9.0	11 7.6	29.1	A	9.5	33.7	25.8		8.5	47.3	18.2		9.3	54.9	31.9		8.6	20.2	1.2	
9.4	18.2	39.8		9.5	25 13.5	21.6		9.5	55.1	11.0		9.5	47 11.2	7.8		9.0	39.0	50.5	
7.3	35.7	11.3	A	8.7	23.1	2.4	A	9.3	58.8	35.1	B	8.8	12.0	25.1	A	9.4	2 24.6	20.5	
9.5	38.2	3.5		9.1	24.5	1.0	A	9.5	36 1.4	32.9		9.2	17.2	33.1	A	9.5	31.9	0.8	
8.7	38.7	22.4	A	9.1	27.5	2.4	A	9.0	1.5	30.4		9.5	26.4	47.1		9.4	3 5.6	24.1	
9.5	45.8	2.5		9.3	28.8	59.2	B	9.5	5.7	28.6		7.8	46.9	28.6	A	9.4	8.7	18.3	
8.3	12 20.8	30.1	A	8.5	55.3	43.8	A	9.0	11.1	29.9		9.5	47.0	51.5		9.5	4 20.0	49.2	
8.3	31.9	45.1	A	9.5	58.0	31.7		9.5	12.2	28.2		9.5	48.0	41.1		9.3	5 11.5	55.5	
9.5	35.7	12.3	R	9.5	59.0	32.1		9.4	12.6	15.7		8.8	51.6	58.9	A	9.3	16.4	38.0	
9.5	13 6.5	16.1		9.5	26 0.0	32.4		9.0	14.4	42.7	S	8.9	53.2	5.8		8.1	48.0	2.8	
9.2	6.7	40.2	A	9.5	32.2	5.1		9.5	18.8	52.2		9.4	48 5.7	0.5		7.5	6 47.1	40.3	S
9.5	20.6	53.3		9.0	32.8	5.8		9.5	26.8	5.5		6.6	19.1	59.3	B	9.4	7 51.0	4.3	
9.0	34.4	25.0	B	8.5	45.8	14.1	A	8.8	29.2	31.6	A	9.1	19.3	14.2		9.0	8 5.4	14.8	
9.2	40.4	0.7		8.9	46.7	1.1	A	9.5	31.1	26.0		7.5	24.8	50.0	A	9.5	18.1	16.8	
8.5	52.2	57.7	R	8.5	55.8	31.7		9.5	32.2	24.0		9.1	35.7	41.1		8.9	18.6	28.1	
9.3	14 1.8	8.5		9.5	57.0	41.4		9.5	38.9	28.4		9.5	36.4	1.4		8.8	18.6	58.4	
9.4	4.1	54.7		9.5	27 2.1	3.5		9.1	38.9	31.7	S	8.2	52.8	50.0	A	9.2	9 0.6	50.3	B
9.5	16.2	38.0		9.5	14.3	5.2		9.5	39.1	25.5		9.0	49 6.1	25.6		9.5	16.5	49.1	
9.1	27.1	3.7	A	9.5	17.7	40.8		9.4	48.0	46.2		9.5	14.9	23.1		8.9	11 24.9	20.7	B
8.8	27.4	8.3	A	9.5	36.2	17.2		9.5	52.4	51.4		9.4	26.6	14.0		9.5	26.3	0.5	
9.3	34.1	40.2		9.0	28 21.8	18.3	A	9.3	37 14.5	28.3		9.4	30.7	13.5		9.1	55.7	2.1	
9.2	44.2	10.3		9.5	31.8	32.0		9.3	15.7	41.3		9.5	50 5.5	31.3		9.5	12 9.9	22.2	
9.2	15 16.0	22.9	A	9.5	34.5	36.7		9.5	16.1	49.2		9.5	19.5	40.3		9.4	27.1	29.5	
9.1	27.8	13.2		9.5	44.3	59.4		9.5	18.9	20.7		9.4	23.5	12.4		9.4	31.6	9.5	
9.3	27.8	8.5		9.4	54.2	45.6		9.0	25.2	23.9	A	9.0	33.8	5.8		8.3	45.0	14.5	
9.4	41.2	2.5		7.7	54.7	5.0	A	9.3	38 39.0	9.8		8.7	41.4	18.2		6.6	14 52.1	52.4	A
9.4	44.5	23.1		9.5	29 2.8	57.6		9.5	39 7.6	31.9		9.5	54.9	13.2		9.3	58.4	23.1	
8.8	48.1	57.0	A	9.5	10.5	36.1		9.5	20.1	51.3		9.4	56.2	18.2		9.5	15 47.2	20.5	
9.5	16 19.8	24.7		8.5	22.4	26.8	A	9.5	34.3	47.8		9.5	51 24.6	13.1		9.0	16 4.3	21.5	
9.5	17 5.7	49.1		7.2	22.6	19.9	A	9.5	34.6	1.2		9.3	30.3	20.9	B	9.1	6.0	15.2	
9.4	13.0	39.5		8.8	23.2	53.3	B	8.6	38.0	17.2	A	9.4	39.8	9.3		9.4	16.2	40.0	
9.1	30.9	40.2		9.5	44.1	31.6		9.0	39.5	19.0	A	9.5	52 16.3	36.5		9.5	40.6	3.2	
9.5	57.1	37.0		8.6	30 8.2	9.7	A	9.4	40 44.0	53.3		9.5	25.7	37.7		9.5	54.1	49.2	
9.0	18 32.2	34.0		9.5	41.7	3.2		9.5	48.2	31.3		9.3	47.1	21.4		9.5	54.6	20.5	
9.5	46.1	7.9		9.2	44.4	53.5		9.5	50.7	21.6		9.5	50.7	11.5		9.0	17 16.7	49.2	
9.5	19 15.5	54.5		9.3	56.2	28.3		9.1	54.6	37.4		9.5	53.2	52.8		9.5	18 3.0	51.1	
9.5	25.4	48.6		9.5	31 37.0	41.2		9.5	41 1.0	55.2		7.7	58.1	0.3	A	9.0	7.2	52.0	B
9.5	56.1	5.7		9.5	48.2	14.3		9.2	7.3	48.2		9.5	53 39.9	15.8		9.3	20.8	17.0	
9.5	20 1.9	2.5		9.0	54.1	21.1	A	9.5	18.5	21.4		9.2	54 37.7	7.3		8.8	46.2	29.2	A
9.2	5.3	13.2		9.5	54.5	30.6		8.6	34.1	12.3	A	9.5	55 0.5	50.0		9.4	46.9	0.2	
9.3	17.8	40.1		9.5	55.0	35.2		9.5	36.0	37.8		9.4	0.5	52.5		8.1	51.9	0.3	B
9.5	47.1	35.2		6.5	32 15.4	17.9	A	9.5	42 24.5	6.6		8.9	29.6	58.5	B	8.5	56.2	1.0	
9.5	59.1	0.9		9.5	19.1	58.2		9.2	58.0	7.8		9.5	45.4	12.2			57.0	17.9	A
9.5	21 2.5	37.4		9.4	25.1	40.7		9.5	43 9.6	33.5		8.5	56 11.5	20.8			[illegible]	18.4	A
9.5	31.3	11.5		9.5	58.7	6.4		9.4	10.4	25.2		9.3	13.8	14				6.2	
9.5	41.6	1.9		6.3	33 8.0	41.2	A	8.3	33.3	16.0	L	9.0	10 [illegible]					[illegible]	
7.3	57.3	47.9	A	9.1	13.5	12.3		9.4	33.5	30.9		9.4							A
8.0	22 3.5	8.8	A	9.3	21.9	12.0		9.5	58.6	4.9		9.5							
7.7	7.9	17.7	A	9.5	24.7	2.8		9.5	44 0.0	23.4		9.1							A
7.7	14.7	37.4	A	9.5	28.5	9.3		9.1	58.9	57.9		9.5							
7.9	17.5	46.3	A	9.3	37.5	48.6	B	9.5	45 7.0	41.2		8.7							
9.5	22.4	47.8		8.5	34 13.3	35.2	A	9.5	14.1	35.2		9.5							
9.5	50.5	23.8		9.5	17.2	16.1		9.5	48.7	31.3		8.4							
9.5	51.6	43.0		9.5	22.7	25.7		8.8	54.8	57.7	A	9.							

581—560				561—620				621—680				681—740				741—800			
	2ᵘ	+60°			2ᵘ	+60°			2ᵘ—3ᵘ	+60°			3ᵘ	+60°			3ᵘ—4ᵘ	+60°	
m	′	″		m	′	″		m	′	″		m	′	″		m	′	″	
9.2	21	38.2	49.7	8.0	34	0.8	46.1	A	9.5	53	21.8	21.1		9.4	14	36.2	31.7	R	9.4	35	35.2	16.8	
7.5		46.3	48.9	A	9.5		9.0	35.4		9.4		46.0	49.2		9.4		59.3	19.0		9.5		46.6	13.5	
9.5		49.7	18.4		9.5		16.4	39.8		9.5	54	12.9	23.8		9.5	15	55.1	28.3		9.0	36	19.4	23.9	
8.0		54.2	44.2	A	9.2	35	27.3	50.8		9.3		54.1	6.6		9.2	17	7.7	21.9		9.4		25.4	46.8	B
9.5	22	4.2	47.5		9.5		30.1	34.6		8.8	56	28.7	45.4	A	9.1		16.8	3.3		9.3		28.3	26.2	
9.5		14.6	48.2		9.5	36	11.5	32.0		9.5		34.0	48.8		9.5		36.9	54.3		8.8	37	22.6	32.7	A
8.3		22.9	52.8	A	9.5		22.9	7.9		9.3		40.1	5.1	B	9.4	18	7.2	4.2		9.5		31.1	51.4	
9.5		28.3	41.9		9.0		44.8	53.3		9.5		51.2	50.4		9.5		46.3	53.8		9.1		43.8	48.6	
9.0		50.3	56.0	A	9.5	37	3.6	38.5		9.5	57	31.5	56.1		9.4		57.0	58.7		8.8		47.6	2.9	
9.0		55.9	21.0		9.4		10.7	9.5		9.5	58	38.2	50.5		9.5	19	8.8	1.9		9.4	38	6.2	25.9	
9.5		58.3	48.7		9.5		30.9	46.1		9.4		43.7	43.6		9.5		48.0	3.2		9.0		20.1	52.3	
9.5	23	2.4	45.1		9.5		51.0	6.9		9.4		48.2	31.5		9.5	20	16.6	1.0		8.8		37.5	48.6	A
9.3		5.6	44.5		9.5	38	28.4	37.1		8.2	59	26.6	23.9	A	9.5		25.3	28.2		8.7		51.9	4.4	
9.5		29.7	5.3		9.5		35.0	31.8		8.6		28.7	34.5	A	9.0		43.7	45.5		8.4	39	14.3	54.9	A
8.1	24	36.7	28.1	B	9.0		53.9	58.5		9.3		58.9	50.9		9.0		51.8	13.4		8.7		21.9	8.5	
9.5		47.5	4.8		9.3	39	32.0	56.6		7.0	0	0.0	4.4	A	9.5	21	7.3	50.6		9.5		40.0	50.2	
9.5		49.8	7.5		9.5		51.7	56.6		9.5		14.4	57.7		9.0		20.0	25.5	R	9.4		59.8	12.9	
9.4		51.2	52.3		9.4		56.2	4.2		9.2		32.6	47.0		9.5		57.1	34.7		9.4	40	18.1	3.2	
9.2		53.6	34.5		9.2		58.1	10.0		9.4		34.1	23.0		9.5	22	1.9	13.3		9.5		20.6	49.2	
9.2	25	3.9	31.5		9.5	40	1.8	59.4		8.8	1	11.5	15.2		9.4		7.8	13.8	B	9.5		44.8	28.3	
9.5		23.4	6.3		8.2		23.9	32.5	B	9.5		24.5	8.6		9.2		7.9	0.4		9.1	41	2.0	38.8	
9.4		53.7	58.3		9.5	41	43.2	38.9		9.4		36.7	19.4		9.5		22.8	41.3		7.8	42	36.4	44.3	B
9.5	26	48.5	22.5		8.3		53.4	29.5		9.5	2	18.5	58.0		9.5	23	12.4	30.0		9.5	43	4.8	22.9	
9.5	27	9.6	47.5		9.2		58.4	1.2		8.6		26.8	19.3		9.5		18.5	5.7		9.4		10.0	26.3	
9.5		14.9	12.8		9.0	42	1.1	15.4		9.5		42.3	58.0		8.7		43.1	40.6		9.1		37.5	18.3	
9.0		23.1	26.1		8.3		57.4	3.0		9.3		54.5	54.8		9.4	24	5.1	38.6		9.5	44	1.0	17.0	
8.0		23.1	27.8	R	8.8	43	12.2	49.4		9.5	3	3.8	39.7		9.5		12.0	31.7		9.5		10.4	17.8	
9.5		30.2	21.2		9.2		14.7	8.1		9.5		36.9	16.4		9.3		16.1	5.2		5.8		49.3	40.0	A
9.5		58.3	36.6		9.0	44	2.1	16.8		9.5		37.5	10.4		9.4		16.7	7.0		9.3	46	28.7	48.0	
9.5	28	1.6	35.3		9.5		7.8	36.7		9.2		55.6	5.4	B	9.2		30.8	28.6		9.0	48	22.1	52.4	
9.5		6.3	34.4		5.9		39.0	55.5	B	8.0		56.2	34.8	A	9.1		48.5	32.8		9.5		26.2	39.8	
9.5		14.0	56.9		9.1	45	3.5	37.4		8.7		59.9	8.2	A	9.3	25	44.0	10.4		9.0	49	1.7	2.6	
9.5		41.0	25.9		9.4		36.2	24.1		9.0	4	4.2	7.6	A	9.2		44.2	13.3	B	8.5		39.8	20.3	A
9.5		46.5	5.6		9.1		40.2	49.5		9.5		40.3	40.1		9.5	26	11.8	28.3		8.5		57.6	16.4	A
9.5		54.3	37.6		9.1		44.7	58.1		9.4	5	12.5	45.1	B	9.5		17.3	35.4		9.0	50	37.5	18.8	A
9.5		57.5	29.6		9.3		51.2	4.3		9.4		20.4	16.5		9.5		22.5	33.8		9.5	51	15.4	43.8	
8.7	29	1.2	52.9	R	7.8	46	15.7	32.1	L	9.3		23.0	24.6		9.5		25.1	4.2		9.5	52	14.5	40.8	
9.5		9.8	21.8		9.4		33.3	0.6		9.4		23.0	30.8		9.5		32.8	23.0		9.5		27.3	16.8	
9.5		11.9	58.8		9.5	47	12.4	33.0	B	9.5		27.5	29.3		9.4	27	7.2	40.6		8.5	53	51.7	39.4	
7.3		26.1	51.4	S	9.0		26.7	22.1		9.5		53.2	44.8		8.3		17.6	50.9	A	7.8	55	59.4	29.1	A
7.8		40.2	39.3	S	9.2		28.5	47.6	A	9.5		58.6	35.5		9.1		27.1	19.4		9.5	56	0.5	38.5	
9.5		40.9	39.8		9.5		32.0	48.1		9.0	6	0.9	34.4	B	9.5		36.0	28.1		9.5	57	25.4	14.9	
9.3		59.5	12.9		9.4		32.4	10.8		9.5		50.2	37.6		9.5		55.9	23.8		9.5		31.6	9.9	B
9.2	30	3.9	30.2		9.1		38.5	50.8	A	9.5	7	24.5	39.0	B	9.5	28	3.8	50.5		9.2	59	40.7	50.3	
9.5		29.2	8.3		8.8		58.0	18.4	A	9.4		26.9	16.2		9.3		30.0	7.0		9.1	2	3.5	15.4	
9.4		57.6	29.1		9.1	48	0.0	0.7	A	9.0	8	48.2	14.6		9.4		34.5	8.4		9.5		44.8	40.0	
9.5	31	22.5	54.1		9.5		7.2	20.4		8.6		48.9	45.0	R	8.3		59.8	34.6	A	9.1	3	42.4	45.9	
7.1		25.9	58.4	L	7.2		21.0	42.2	A	8.5	10	24.1	55.9	A	8.6	29	4.8	10.8	B	9.2		56.7	35.0	
9.5		34.6	14.7		9.5		59.9	49.1		8.4		45.8	59.3	B	8.8		24.4	23.3	A	9.0	4	26.4	39.0	
9.2		34.8	53.0		6.9	49	6.5	48.2	A	9.2	11	12.9	7.8	B	9.3	30	58.9	6.2		9.0	5	25.6	2.1	
9.3		46.3	59.3		9.5		33.9	9.6		8.0		28.9	46.1	A	9.3	31	5.2	11.1		8.6	6	1.7	28.2	
9.5		54.1	58.0		9.5	50	27.0	17.2		8.9		43.7	52.4		9.3		48.8	15.3		7.0		6.2	7.1	A
9.5	32	8.6	8.2		9.5		32.2	34.6		9.0		48.6	13.1	B	9.4		50.5	4.4		8.4		32.0	36.9	B
9.1		12.8	12.9		9.3		34.5	36.9		9.5		52.4	55.5		9.5	32	45.4	40.7		8.1		34.5	53.7	
9.5		27.9	53.9		9.2		52.4	18.6		9.5	12	9.2	59.6		7.3		46.0	59.8	A	8.8	7	19.4	39.0	
9.5		32.5	18.0		9.0		52.0	57.2		9.4		50.5	9.2		9.5	34	13.1	49.8		9.0		47.9	25.7	
9.5		42.1	43.5		9.4	51	41.7	53.5		9.4	13	11.9	1.0		9.5		39.2	42.3	B	9.4	8	32.5	41.0	
9.5		42.3	45.6		9.1		44.0	23.2		8.4		54.2	55.9	A	9.5		41.0	38.2		8.8		35.6	46.9	
8.9	33	25.8	14.9	A	8.8		57.9	15.8		9.5	14	2.5	36.7		9.5		46.3	9.3		8.7		59.6	25.8	
9.5		53.0	43.2		9.4	52	24.7	20.5		9.4		35.7	57.4		8.6	35	5.5	24.0		5.7	9	13.9	23.7	

801—860				861—920				921—980				981—1040				1041—1100			
	4ᵘ	+60°			4ᵘ—5ᵘ	+60°			5ᵘ—6ᵘ	+60°			6ᵘ—7ᵘ	+60°			7ᵘ	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	9 45.3	23.7		9.5	58 16.5	45.3		8.0	50 45.6	26.3	A	9.5	23 34.6	43.0		9.5	5 44.4	33.8	
9.5	10 19.4	25.7		9.5	59 5.9	59.0		9.0	51 16.5	16.5		9.5	24 18.6	39.0		9.5	6 13.9	56.0	
9.0	41.3	29.1		9.4	0 1.9	7.1	A	9.0	52 7.1	41.5		9.2	20.5	2.2		9.2	24.4	46.1	
9.1	11 30.9	44.8		9.0	2 39.9	41.8		8.2	17.0	27.6	A	9.5	53.1	15.4		9.2	7 1.0	0.9	
8.7	42.3	51.8	A	9.5	3 24.1	58.7		8.2	21.9	40.3	B	8.4	25 5.0	11.8		9.4	9 6.4	48.1	
9.2	12 35.0	9.6		9.4	29.3	5.5	A	9.5	41.7	57.5		9.0	12.2	20.3		8.0	6.5	35.4	B
9.5	37.6	18.8		8.7	45.4	6.0	A	9.5	53 59.2	58.3		9.5	27 12.6	32.5		8.9	8.9	14.7	A
9.3	14 25.6	29.4		9.0	47.9	28.6	A	9.1	54 2.3	28.1		9.5	36.2	22.6		6.5	33.9	9.4	A
9.4	28.3	42.6	B	9.5	4 18.3	59.7		9.5	56 48.8	30.6		9.4	28 29.3	39.4		9.3	10 12.7	33.4	A
9.5	15 12.6	10.0		8.2	33.4	0.2	A	9.4	51.0	0.6	B	8.8	29 34.2	22.2		9.5	21.6	46.6	
9.5	16 14.7	59.6		9.5	5 53.5	52.7		6.9	58 9.0	28.5	G	9.5	53.9	24.6		9.5	11 40.9	30.3	
9.5	18 17.4	58.4		9.4	54.4	11.4		9.5	18.0	31.0		9.5	31 32.4	38.5		9.5	12 10.7	11.7	
9.5	19 17.2	59.7		9.0	59.2	5.6		9.5	0 54.6	39.4		9.5	33 0.0	47.8		8.8	13 18.5	40.6	A
9.5	29.1	56.8		9.5	6 48.4	32.5		9.5	1 43.7	30.0		9.5	20.2	28.2		8.7	45.2	50.7	
9.2	42.8	2.1		9.4	7 12.7	8.8		9.5	2 12.6	10.5		9.5	41.0	1.6		8.8	49.6	53.3	A
9.5	21 16.6	23.6		9.2	16.3	6.6	B	9.5	13.0	27.5		9.3	34 20.0	37.7		8.9	15 58.0	12.2	
9.2	20.9	48.2	A	9.4	29.4	16.5		9.5	27.6	43.8		9.1	25.2	2.3	B	9.5	16 20.4	27.5	
9.4	29.3	25.4	B	9.0	9 27.4	11.7	B	5.8	41.2	1.7	A	9.0	35 58.9	20.4		9.5	17 31.0	4.2	B
9.3	22 25.9	58.2		9.5	10 42.8	33.5		9.5	43.5	52.3		9.1	36 7.9	5.2	A	8.8	18 46.0	48.1	
9.4	34.0	58.0		9.5	12 28.0	51.7		9.5	3 40.0	31.5		8.6	27.0	20.4	A	8.4	49.5	46.1	
9.3	37.8	51.7		9.4	13 16.9	36.0		8.7	4 40.5	32.3	A	8.3	37.8	19.0	A	7.8	21 18.9	19.5	F
9.4	23 31.8	54.1		9.5	14 41.4	18.4		9.5	55.5	11.8		8.5	39.8	38.1	A	8.1	49.9	7.9	A
9.3	36.9	30.6		9.5	15 45.8	58.1		9.5	5 1.6	51.0		8.6	52.6	28.7	A	8.8	22 46.2	57.3	A
9.0	24 43.3	50.8	A	7.0	16 53.4	8.5	L	9.1	7 15.9	56.7	B	9.2	38 15.4	27.3		9.5	23 18.2	17.0	B
7.8	25 9.9	22.1	A	9.5	17 32.0	58.0		9.1	32.3	48.3		8.5	39 21.8	33.2	A	9.4	34.1	16.5	B
7.0	31.1	35.0	A	9.4	18 17.4	31.0		9.4	42.0	5.0		9.4	53.7	14.5		9.2	24 31.1	54.3	A
7.7	45.2	55.4	A	9.5	54.8	27.6		9.1	43.4	6.6		9.5	41 5.2	9.2		9.5	41.0	27.0	
9.5	27 28.9	59.0		9.5	21 26.4	29.5		9.4	8 16.0	36.5	R	9.3	22.5	1.8		9.5	45.2	46.1	
9.5	28 3.5	58.6		9.3	22 1.5	24.5		9.5	34.4	24.7		9.3	42 24.9	39.4		6.7	49.2	50.4	A
9.5	31 2.5	49.9		8.0	24 2.2	29.5	A	9.5	38.7	37.5		9.3	42.2	56.3	B	9.2	25 32.5	23.5	A
9.3	23.7	32.7	B	9.5	35.4	48.7		7.0	53.0	49.7	A	9.3	43 19.6	49.8	B	9.4	27 13.0	5.1	B
9.0	27.9	13.9		9.3	26 51.5	30.5		9.5	9 45.2	1.0		9.5	44 50.9	31.3		9.3	29 19.6	54.7	
9.3	29.7	32.7	A	9.2	27 28.9	49.6		9.0	10 7.0	29.1	A	9.5	57.0	31.3		9.4	30 39.0	37.3	
9.1	33 14.4	38.4	A	7.0	28 32.2	31.9	L	9.0	16.0	49.7	A	9.1	45 0.0	24.3		9.4	31 21.0	23.4	
9.5	24.5	47.6		9.3	29 45.4	49.1		7.0	11 9.0	9.0	A	7.5	6.3	58.5	B	9.4	32 18.5	45.1	
9.0	34 26.4	1.7	A	9.3	47.0	54.1		9.3	10.0	52.8	A	9.5	7.9	25.6		9.3	39.5	11.1	B
9.4	42.9	42.5	B	7.8	30 21.0	56.3	A	9.3	11.7	47.1		8.7	14.1	46.4		9.5	58.1	9.8	
9.0	37 3.9	12.5	A	9.5	31 15.4	17.8		9.0	14.0	48.2	A	9.4	31.2	27.5		9.1	33 0.5	58.0	A
9.5	13.1	58.1		9.5	32 23.8	40.3		9.4	14.9	57.2		9.5	46 11.0	43.6		8.7	24.4	49.7	A
9.5	58.1	29.0		9.5	26.5	10.4		9.5	12 30.2	40.8		9.4	51.9	27.1		9.4	34 15.0	12.1	
9.3	40 47.9	27.2		9.2	34 12.4	42.2		8.1	53.9	51.7	A	9.3	47 3.6	48.1		9.5	52.4	45.1	
9.4	54.9	49.5		8.8	36 48.7	30.5	A	9.0	13 10.8	8.6		9.5	48 6.4	16.6		7.0	35 25.2	38.6	A
8.7	41 25.8	19.3	A	9.2	38 1.0	51.1	A	7.9	46.6	42.4	B	8.6	25.0	36.3		9.1	37 24.5	10.1	A
9.2	56.9	38.9		9.5	26.4	5.0		9.0	14 46.0	28.1		8.5	50 19.4	49.1	A	6.7	36.4	40.5	A
8.5	42 7.5	49.5		8.7	55.6	54.0	A	9.5	15 1.4	17.4		9.0	53 1.9	32.8	A	8.7	38 58.2	17.4	A
9.4	42.9	0.7	A	9.0	39 13.1	48.2	A	9.5	19.2	49.8		7.0	13.2	0.5	A	9.5	39 17.3	0.7	
9.0	43 42.4	37.5		8.9	29.2	41.3	A	9.5	25.3	42.1		8.5	28.8	20.3	A	9.5	20.6	53.6	
9.3	44 20.4	30.5	B	9.5	40 46.3	7.8		9.5	44.6	50.8		9.5	55 5.0	[illegible]		8.9	40 15.3	7.5	A
9.5	47 14.1	54.3		9.4	50.0	16.2		9.2	16 20.0	37.1		8.8	53.9				31.8	49.9	
9.2	39.4	43.3		9.4	56.9	8.5		8.0	17 2.6	52.3	A	9.4	56 44.8				[illegible]	10.3	A
9.5	48 17.9	32.0		9.1	41 2.7	27.9		7.2	21.5	13.8	A	8.6					20.1	35.5	A
9.0	20.3	58.4		8.6	4.0	0.1	B	9.0	18 0.6	20.7		8.[illegible]					[illegible].9	30.0	
7.0	36.7	50.8	L	9.4	42 39.7	30.0		9.1	12.0	7.6	A	9[illegible]					[illegible]	6.7	B
9.5	49 45.4	29.0		9.5	44.4	30.3		8.5	19 16.8	49.7		7[illegible]						8.9	A
8.7	50 28.4	11.4	L	7.1	45 40.8	21.4	B	8.5	59.0	5.4	A	8[illegible]						56.2	B
5.0	34.9	12.9	S	8.9	56.7	45.8		9.2	20 10.6	24.1		9[illegible]						6.9	
6.7	53 26.7	57.7	A	8.8	46 10.8	2.9		8.5	21 47.6	34.0	A	9[illegible]						.6	A
9.2	54 25.3	59.7		9.5	39.5	36.5		8.0	55.3	47.3	A	7[illegible]						.0	
9.5	57 25.5	8.0		9.5	48.6	8.0		8.4	22 36.0	1.2	A	7[illegible]						1	A
9.5	34.2	6.0		9.5	47 32.8	15.4		9.0	23 32.6	45.2	B	9[illegible]						2	A

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	7ʰ—8ʰ	+60°			8ʰ—9ʰ	+60°			9ʰ—10ʰ	+60°			10ʰ—11ʰ	+60°			11ʰ—12ʰ	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	47 31.2	22.3		8.5	47 17.8	42.3	L	8.0	45 59.7	7.6	A	9.5	32 20.4	41.2		9.1	35 21.1	40.9	
9.4	56.7	57.0	B	9.5	50 18.9	23.2		8.6	47 36.2	57.6	R	9.0	32.6	47.1	A	9.5	28.3	34.0	
9.5	48 18.8	53.2		9.5	23.3	42.5		9.1	48 30.0	46.8	A	9.5	38.0	30.9		9.3	36 14.6	3.5	
9.2	49 9.6	49.3	B	9.5	26.3	16.9		9.5	37.0	11.0		9.5	35 18.4	35.8		9.3	22.6	24.7	
6.1	19.2	42.3	G	9.1	34.5	5.1		9.5	49 7.7	51.5		9.5	36 18.9	29.0		9.4	25.0	5.2	
8.3	50 3.8	48.7	F	9.0	51 42.4	34.0	A	9.0	28.2	20.1		9.5	58.4	20.5		9.1	25.5	37.5	A
9.1	52 11.3	32.0	A	9.5	45.3	42.8		9.0	50 32.0	21.1	R	8.3	37 22.0	0.1	A	7.7	55.7	50.7	A
9.5	54 8.0	54.7		9.2	53 37.3	20.3	A	8.6	51 57.3	51.5	R	8.5	38 6.3	24.0	A	9.4	56.8	0.1	
9.2	16.0	26.3	A	8.9	44.0	50.8	A	9.5	58.6	10.3		7.2	15.1	51.9	A	8.9	37 18.0	5.8	A
9.2	56 10.3	16.4	A	9.0	57 52.2	54.2	R	9.5	52 21.0	56.5		9.4	33.4	25.0		9.5	38 32.6	53.8	
9.1	40.4	43.9	A	9.2	58 26.3	30.1	A	9.5	53 11.2	10.3		9.4	47.3	30.9		9.4	34.9	26.2	
8.6	50.9	16.4	A	8.5	41.3	46.4	A	9.3	22.1	5.4	A	9.5	40 38.4	33.8		7.7	45.1	0.2	A
8.7	58 3.4	21.3	A	9.4	41.7	47.4	B	8.3	34.5	34.3	R	9.3	44.7	51.3	A	9.3	48.5	46.0	
8.0	59 24.2	44.9	A	9.5	59 52.3	39.5		8.0	54 24.3	22.1	R	8.5	41 5.4	39.8	A	8.5	52.7	38.9	A
9.3	51.4	20.3	A	9.4	0 43.4	49.8	A	9.5	46.1	20.6		8.0	42 0.1	55.5	A	8.6	39 20.1	48.2	A
9.2	0 55.4	0.7	R	9.5	2 17.8	39.0		9.0	55 9.0	39.1	A	5.8	15.6	4.9	A	9.2	43 36.3	50.8	B
8.3	3 10.7	27.2		8.8	52.4	48.3	R	8.5	49.0	57.5	A	8.3	48 28.1	53.2	A	9.2	44 41.0	21.2	
9.2	23.0	14.4		9.1	5 36.9	58.8	A	8.2	57 12.0	28.4	A	9.5	41.2	48.9	B	9.5	45 1.6	9.5	
6.8	35.4	49.8	G	9.4	6 36.4	22.1		9.1	58 13.0	40.6	B	7.7	49 21.8	2.5	A	9.2	43.1	10.0	
9.5	4 44.6	44.8		8.3	52.4	39.0	A	8.7	36.2	52.8	A	9.4	50 2.0	54.8	A	8.0	46 19.5	29.1	A
8.7	5 10.9	59.3	A	7.3	9 21.1	22.8	G	9.5	59 50.7	36.3		8.7	52 39.1	53.9		8.5	43.3	9.4	A
9.3	22.2	16.4		9.4	39.4	1.7		9.5	0 30.1	37.9		9.0	53 7.8	19.1	A	8.0	48 12.6	29.0	A
8.9	40.0	53.1	A	9.0	11 39.6	27.7	A	9.5	2 33.6	42.2		9.3	51.9	21.4		9.5	49 0.4	59.8	
6.0	46.9	0.1	A	9.5	47.2	10.0		8.9	4 12.5	36.4		8.6	54 0.4	55.5	R	9.5	34.5	22.8	
9.3	59.7	6.1		9.5	12 31.3	29.1		7.7	24.6	6.4	R	8.8	12.1	12.0	A	9.4	51 21.9	49.8	
8.4	6 41.7	56.2	A	9.5	13 41.5	19.3		6.3	5 7.5	43.7	A	8.0	55 27.7	38.5	A	9.5	24.7	44.4	
9.2	43.4	1.1	A	8.0	52.2	37.0	A	9.3	15.8	16.1	B	9.0	45.2	35.5	A	8.1	52 20.2	58.0	B
9.4	7 50.3	31.5		9.5	14 42.4	12.0		8.2	53.5	3.9	A	9.0	56 21.1	19.8	A	7.5	53 11.5	9.6	A
9.4	10 19.8	30.1		9.5	15 28.3	10.0		9.5	54.2	38.8		8.8	57 7.2	36.1	A	9.2	39.4	56.9	A
9.0	13 4.6	2.6	A	9.2	16 31.3	59.5	R	6.7	6 2.8	51.9	A	9.5	58 36.2	7.1		8.4	55 17.1	19.7	A
9.0	35.6	54.4	A	9.5	17 44.9	29.2		8.5	43.5	5.9	A	9.4	51.3	20.8		9.5	57 26.1	0.7	
8.3	57.8	9.5	A	8.4	18 38.2	28.2	A	9.5	9 42.2	19.6		9.3	0 37.6	58.6	A	9.2	58 36.6	22.7	A
9.2	16 19.2	34.0	A	9.0	19 59.1	32.1	A	9.2	10 56.1	58.4	A	9.5	1 42.2	49.8		9.3	45.1	45.8	
9.5	17 27.0	15.4		8.8	22 40.2	26.2	A	9.0	11 55.0	2.4	A	8.9	4 59.0	32.6	A	8.5	59 38.6	34.5	A
9.5	18 36.1	40.0		8.9	23 27.6	57.9	A	8.6	12 4.5	17.2	A	9.5	5 8.9	56.3	B	8.9	0 9.1	31.1	A
7.8	19 10.1	23.5	B	9.5	25 6.4	8.1		9.3	14.4	16.2	A	8.6	7 3.2	34.1	S	9.1	18.0	51.0	
9.2	14.4	10.5	A	9.3	26 46.0	40.5	A	8.8	34.9	16.7	A	9.0	27.7	49.3		9.5	2 39.7	59.7	
9.2	22 4.9	9.0	A	6.5	48.6	51.0	A	9.4	14 28.8	14.7	A	6.7	45.7	42.9	R	9.0	3 7.0	54.9	A
9.0	31.6	48.5	A	9.4	28 36.0	41.5		9.0	15 34.8	0.0	A	9.1	9 31.0	58.8		9.5	56.4	40.8	B
9.5	54.3	57.0		9.4	30 47.6	19.3		9.5	58.3	48.1		9.5	10 13.8	40.5		9.5	58.6	12.5	
9.3	23 5.4	36.6	A	9.0	31 57.0	56.2	A	7.5	16 26.6	0.6	A	9.3	23.3	29.1	A	8.7	4 0.1	6.3	A
9.4	24 51.3	23.3	B	9.3	32 17.5	53.6		9.5	17 56.0	57.5		9.3	11 52.3	37.0		8.4	45.7	29.5	A
9.5	56.5	24.7		9.5	42.4	32.7		6.5	18 3.6	19.4	A	9.5	14 40.9	13.0		7.7	5 50.1	31.7	B
9.0	25 11.4	32.5		9.4	33 31.3	14.9		9.0	19 1.9	44.2	A	9.1	44.7	36.5		9.1	57.6	37.5	A
9.4	26 7.0	10.5		9.4	33.5	3.6		8.3	54.3	48.1	A	9.5	16 6.2	15.4		9.5	6 2.4	18.9	
8.3	31.8	57.4	A	9.0	35 2.2	19.8	A	8.5	21 15.9	30.3	A	7.5	22.6	27.2	A	9.5	13.4	26.0	B
9.2	51.4	7.6	A	9.4	30.4	2.2		9.5	50.4	29.0		9.3	30.0	56.7		9.5	8 39.0	29.6	
6.8	27 20.4	25.7	A	9.3	37 3.7	11.5	B	9.5	24 53.4	58.5		9.5	18 19.3	11.5		9.5	9 32.7	13.8	
7.5	28 36.9	5.1	A	7.4	38 14.3	46.0	B	9.2	26 12.3	41.6		9.5	19 1.7	43.0		8.7	10 24.1	3.2	A
9.5	29 15.0	35.1		8.5	39 2.6	39.5	A	8.9	27 51.9	31.9	A	6.8	23 6.2	29.6	A	9.5	12 9.5	50.3	
9.2	15.4	24.7	A	8.7	40 4.9	52.0	A	9.5	28 1.0	52.7	B	9.4	48.1	54.4		9.0	14.5	28.2	A
8.9	30 10.4	24.7	A	9.5	29.4	2.2		9.5	11.5	49.9		9.4	24 21.8	39.1	B	9.5	14 47.1	44.8	
9.3	34 34.0	35.5		9.5	41 39.0	9.0		9.5	44.9	21.6		8.8	39.6	51.9	A	8.9	53.6	35.5	
9.5	36 39.9	2.1		9.5	42 5.2	59.2		6.7	51.1	51.6	A	9.4	26 55.2	4.6	B	8.5	15 5.5	23.3	B
9.1	41 45.9	24.7	A	9.5	46.8	10.5		9.5	29 15.4	10.3		9.3	29 6.6	6.5		9.5	22.4	10.0	
9.0	43 44.5	0.7	A	7.0	43 48.1	35.6	F	9.5	30 14.8	59.8		9.5	36.0	36.0		7.2	53.2	55.9	B
7.7	44 30.6	53.4	A	9.1	58.0	27.2		9.0	37.5	41.7	A	9.3	30 21.7	18.4	A	7.3	16 55.0	54.6	A
8.5	45 18.2	57.1	A	9.5	44 5.7	4.6		9.3	56.8	32.4		9.4	32 9.1	21.3		8.3	17 33.0	18.4	A
8.3	41.6	46.3	A	9.4	45 6.9	16.9		8.0	31 34.3	5.9	A	7.5	49.5	54.5	B	8.4	18 28.4	20.9	A
9.4	46 7.3	28.1		9.5	49.4	57.9		9.1	32 1.0	51.0	A	9.5	33 23.5	21.8		9.4	22 20.8	58.9	

1400—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	12ʰ—13ʰ		+60°		13ʰ—14ʰ		+60°		14ʰ		+60°		14ʰ—15ʰ		+60°		15ʰ—16ʰ		+60°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.4	22	40.3	13.1	5.3	23	8.4	42.7	A	9.5	8	32.0	4.2	9.0	57	54.8	9.1	9.4	53	14.1	58.0	A
9.4	23	7.5	16.6	B	9.0		14.2	22.1	9.4	9	18.1	44.4	6.0	58	3.6	46.5	B	9.5	54	58.9	14.1
9.4		39.0	0.0		9.1		25.0	55.8	B	9.5		18.5	16.6	9.5		17.2	37.1		8.4	55	59.4	10.7
9.5	26	15.2	0.0		8.5		29.6	40.0	A	8.5		30.3	33.6	A	6.5	0	4.0	36.6	A	9.4	57	7.7	5.8	B
8.9	27	29.6	32.5	A	8.3		56.1	45.4	A	9.5	11	17.3	15.5		8.2		13.0	6.2	B	7.5	59	17.4	1.8	G
var	29	46.6	17.2	B	9.2		56.2	39.3	A	9.3		19.5	46.3		7.2		50.5	6.0	B	8.5		30.9	54.0	S
9.5	30	40.7	0.5	B	8.9	24	33.7	48.6	A	9.2		22.7	54.9	A	9.0		56.6	27.3		9.5		43.7	28.2	
8.5		43.9	1.1	A	9.0	25	52.7	16.2	A	9.5		52.7	52.0		9.5	1	38.8	51.7		9.3	0	11.4	26.6	B
9.1	31	46.1	48.2		9.3	26	27.8	53.5		9.5	12	3.6	47.0		7.8	2	55.0	22.3	F	8.0		30.6	51.1	S
9.5		50.2	25.3		8.4		44.7	35.9	A	9.3		42.8	18.4		9.0	4	28.6	28.2		9.5	1	20.9	8.3	
9.2		54.7	29.6	B	8.4	27	1.6	22.6	A	8.3	14	11.3	45.9	A	9.5	5	30.7	28.7		9.5		38.5	1.4	
9.5	32	15.0	18.6	B	9.3	29	41.9	41.8		9.1		29.8	14.4	A	9.0		31.0	44.4	A	9.1	2	4.8	26.1	B
8.3		42.6	32.9	A	9.0	30	11.5	58.4		9.5		44.4	4.2		9.0	6	8.0	28.7	A	7.0		19.4	26.2	B
9.5	33	25.5	52.6		8.9		13.7	39.4	B	7.3	18	25.8	26.3	F	8.3	9	28.5	40.5	A	9.0		31.9	37.7	
8.9		49.6	28.5	A	9.3	31	18.3	37.0		9.5	19	50.3	24.2		9.4		38.8	50.3		9.5	3	16.9	57.7	
8.2		52.5	19.6	A	8.2		37.8	26.1	A	9.2	20	24.5	54.6		9.1	10	27.5	28.7		9.3	5	1.6	50.5	A
9.0	37	7.6	49.6	A	9.5	34	35.5	46.4		9.1	21	53.4	0.1	B	9.0		33.6	5.7		9.3		55.5	59.4	A
9.5		39.5	42.3		9.3	35	6.8	6.2		9.4		55.3	5.7		9.1	13	12.7	17.9		6.8	7	28.4	15.1	G
9.5	40	5.0	50.1		9.3		28.1	4.2		9.4	22	56.4	23.9		7.8		32.4	39.0	A	7.8	8	18.9	3.3	G
9.5		57.6	39.3		8.8		37.6	27.8	B	9.4		56.6	4.1		9.2		42.5	20.9		8.5		31.9	18.2	
8.0	42	57.5	9.2	A	8.8		38.1	26.9	B	7.3	23	30.3	22.4	A	8.5		57.2	45.9	A	9.3	10	47.9	27.5	B
8.7	44	42.8	46.9	A	9.1	36	27.3	41.4		8.3	24	21.5	41.3	B	9.5	14	15.7	0.3		8.6	12	59.4	36.2	A
8.6	46	23.1	40.7	A	9.5		38.0	59.0		9.4		46.3	3.1		8.1	15	34.5	2.8	B	9.4	13	26.4	27.9	A
9.0		39.9	32.4	A	7.5	38	42.8	33.1	A	8.0	25	6.4	32.0	B	8.7	16	27.0	46.0	A	7.8	14	34.6	53.1	
7.9		59.9	43.4	A	6.5		54.4	52.6	A	9.2		12.9	53.9	R	7.4		54.3	51.5	A	5.5		50.4	4.9	A
8.0	47	24.9	18.3	A	7.0	39	8.8	4.7	A	9.2	27	33.4	22.8		7.4	17	3.5	53.7	A	8.5	16	12.9	2.4	A
9.2		56.5	7.9	A	9.2	40	2.3	25.2	A	6.2		45.6	51.3	A	8.9		4.4	52.8	B	8.8		53.9	40.2	A
9.3	48	18.0	10.4		9.5	41	3.4	8.5		8.2		54.7	35.2	B	9.3	18	8.0	12.0	A	9.1	17	40.6	9.5	B
8.5	49	19.6	24.6	A	8.7		32.3	39.9	A	9.5	28	53.8	38.7		9.4		57.8	53.3	A	7.0		57.2	7.0	A
9.3	50	7.1	33.4		9.3		55.0	58.9		7.7	30	32.9	29.6	B	9.5	19	32.2	10.6		9.1	19	37.4	3.6	B
9.5		44.5	30.0		9.5		55.3	4.2		9.3		56.3	17.5	A	8.9	20	49.5	26.8		9.0		53.1	35.3	B
9.5		54.4	13.8		8.8	42	2.9	53.5	B	9.1	31	2.6	19.5	B	8.0	22	14.5	30.2	A	9.0	20	3.5	27.9	
9.5	51	45.4	53.1		neb	44	24.4	54.3		9.3	33	46.8	30.2		9.2	27	18.8	3.2	A	8.3		4.6	23.2	F
9.2	53	41.6	11.7	B	8.6	46	30.2	16.0	A	8.4	34	58.3	39.8	B	9.3		55.5	29.7		9.5		18.0	36.7	
8.5		49.1	12.3	A	8.9	49	6.3	36.6		9.3	36	46.8	30.1		7.7	28	46.4	12.5	F	9.5	21	43.7	40.7	B
9.4	54	9.6	7.4		8.5	51	52.3	28.7		9.2		59.3	41.9		9.3	29	46.0	15.0		8.0	22	47.9	38.2	
9.5	55	3.7	11.0		8.5	52	4.9	12.1	B	7.8	38	47.7	50.9	B	9.5		46.8	52.6		9.5	23	59.1	3.9	
7.6	56	23.1	1.5	A	9.3		8.0	26.7		9.2	39	27.0	51.8		9.5	31	7.9	8.4		9.5	24	2.9	33.3	
6.5		42.5	31.4	A	9.2		28.2	21.2	B	9.5		55.5	18.7		8.4		16.6	48.4	A	9.5	25	15.2	13.6	A
9.5	58	0.2	17.2	B	9.3		34.8	40.0		7.3	40	50.9	40.0	B	9.5		18.7	11.2		9.3		22.4	18.0	A
9.4	59	36.0	37.7	B	9.1	54	51.6	12.5	B	9.4	41	41.0	12.9		8.0	32	10.1	44.4	A	9.1		55.4	6.3	A
8.9	0	31.8	1.5	A	9.5	55	16.5	35.1		9.5		44.4	24.0		7.8		19.5	9.6	A	8.0	27	1.6	57.3	J
9.4		33.1	38.8		9.2		23.2	53.3		8.5		56.1	35.8	B	7.9		21.5	34.6	A	9.3	28	9.6	30.0	A
9.1		34.3	12.3		9.0	56	18.8	10.0		9.1	42	13.3	35.8	B	9.3		33.2	5.1		9.4		47.4	29.3	A
8.0		58.0	55.9	A	8.3		37.6	15.9	F	9.4		35.0	22.1		9.4	34	16.2	50.6	A	7.5	29	52.9	47.5	A
9.2	1	30.6	43.1	A	9.3	58	21.8	39.5		9.3		54.3	57.0		9.4		45.7	57.4		8.9	30	41.0	6.4	
9.4		32.0	30.4		9.1	0	4.3	3.6	A	6.8	43	15.5	19.1	A	8.7	35	55.3	28.0		8.9	32	7.2	9.8	
9.4	3	52.8	16.6	B	9.3		42.0	30.2		8.4	44	52.0	15.2	A	9.5	37	12.0	8.5		7.0		56.8	45.8	B
9.5	4	53.5	48.7		8.9		54.4	24.5	B	9.5	47	11.2	38.7		8.2	38	32.9	27.3	S	9.4		58.5	31.8	
9.4		56.2	17.2		9.5	2	7.5	57.1	B	9.5		12.9	57.1		9.3	39	43.1	36.1		9.4	35	45.4	20.1	
9.5	6	5.4	11.3		9.0		14.9	27.8	B	9.5		24.0	49.1		9.2	40	41.0	10.5		8.2	37	3.9	59.7	A
9.2		5.5	48.1	A	8.7		18.4	27.1	B	7.4	50	28.8	6.3	B	8.8	42	13.9	30.2	A	8.9		6.8	46.6	
9.0	7	31.6	42.8	A	9.2		19.6	8.5		9.3		44.0	40.5		9.2	43	13.0	45.0	B	9.5	38	15.0	50.9	
8.0	8	45.6	23.6	A	8.7		44.4	21.7	A	9.5	51	0.0	52.0		8.9		23.7	45.3	A	9.5	39	30.0	46.5	
9.5		55.0	3.4		9.4	4	11.9	52.9		9.4	53	55.5	3.1		6.0	44	43.9	1.7	A	9.5	40	42.4	59.2	
8.0	9	12.3	3.7	B	6.0		16.8	0.8	A	9.4	54	44.0	26.5		9.5	45	14.3	34.1		9.5		58.5	27.9	
9.5	14	12.6	8.4		9.5	6	10.7	29.1		9.5		46.5	10.0		7.4	46	41.8	58.0	B	8.0	42	13.9	14.6	A
7.7		35.1	37.3	B	9.1	7	17.8	16.5		9.5	55	18.7	59.8		8.5	47	18.9	38.5	R	9.3	44	13.2	12.8	B
8.6	16	34.7	33.4	A	9.0		48.3	41.9	A	9.5	56	23.0	30.7		8.8	50	20.4	33.1		8.5		30.4	12.7	B
8.8	19	18.7	26.6	A	9.3	8	23.3	52.2		9.5	57	38.3	24.3		9.3	51	6.5	15.4	A	9.4		34.1	9.1	

1501—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	16h—17h	+60°			17h—18h	+60°			18h—19h	+60°			19h	+60°			19h	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	44 46.4	16.6		9.1	29 42.3	2.4	A	9.2	17 25.2	44.7		9.0	1 30.7	8.5		9.4	21 57.4	37.5	
9.2	45 21.4	7.3		9.4	30 52.0	52.3	A	9.2	34.0	46.8		9.5	2 43.7	34.2		9.5	58.3	2.8	
9.0	32.7	29.4		9.4	31 1.5	58.2		9.2	51.6	43.4		9.5	3 10.9	49.6		7.5	22 1.9	3.7	A
9.0	33.7	10.7	B	8.0	32 19.8	10.7	A	8.8	18 29.2	50.9		8.6	34.7	14.4	A	6.8	11.1	54.9	A
9.5	47.9	42.6		9.5	33 31.7	33.3		9.4	20 13.8	53.0		9.5	55.7	14.9		9.4	17.3	2.8	
8.0	47 14.1	22.8	B	9.3	50.9	5.3		9.5	49.4	55.6		8.8	4 4.9	20.4		9.5	24.2	45.9	
9.3	43.8	37.1		9.2	34 27.3	22.4		8.2	24 6.0	23.4	B	9.3	58.6	52.5		9.5	23 9.2	21.8	
8.8	48 21.3	19.5		8.9	35 24.8	42.5		9.3	50.8	32.7		9.0	5 37.4	3.7		9.2	22.4	25.4	
9.4	49 10.0	33.7		8.9	36 20.3	6.2		9.0	25 1.6	14.0	A	9.1	46.9	37.7		8.9	23.5	41.0	
8.3	59.8	44.5	A	9.5	38 31.5	30.8		9.3	44.5	1.2		9.5	6 23.5	20.2		9.1	24 2.2	9.9	
9.5	50 16.4	43.0		9.4	37.0	12.8		9.5	26 4.7	47.4		8.9	24.6	50.0	R	9.5	33.8	34.9	
9.5	51 46.4	10.6	A	9.5	37.4	8.8	B	8.0	42.1	20.3	L	8.7	25.7	33.3	B	9.4	39.3	23.7	
6.5	52 4.7	36.2	A	9.3	40.6	50.3		9.5	27 47.6	41.0		7.7	29.1	32.7	B	9.5	43.8	6.2	
9.2	19.6	47.6	A	8.9	43.7	2.5	B	9.5	30 48.8	16.4		9.5	7 5.4	9.7		9.4	25 45.2	41.7	
9.0	25.8	5.3	A	8.5	39 47.8	25.4	L	9.2	31 56.6	12.5	A	9.0	24.3	14.6		9.5	26 11.7	37.7	
9.5	35.9	18.3	B	9.5	41 5.9	31.8		9.5	33 31.2	24.3		9.1	31.0	30.0		9.5	30.9	12.7	
9.5	37.0	19.4	B	9.5	20.4	50.5		9.0	42.6	32.7	A	9.4	44.3	49.6	B	9.5	32.5	27.5	
9.5	53 12.2	7.7		9.2	55.8	20.2	B	9.4	42.6	8.1		8.4	8 11.3	4.1	A	9.1	58.3	22.4	
9.5	54 36.9	50.9		9.3	42 22.6	36.1		9.0	34 18.6	54.3	A	9.5	11.9	8.8		7.0	27 21.8	22.0	B
9.3	36.9	36.9		8.5	44.8	38.1	A	6.8	36 38.6	33.7	G	9.4	9 6.6	3.5		9.3	38.0	17.0	
8.8	55 17.0	1.0	A	7.8	58.5	20.9	A	9.2	40.5	53.2	A	9.1	27.2	17.4		9.5	53.2	46.4	
9.0	42.9	40.8	A	9.3	43 8.3	50.5		9.3	37 31.7	20.9		8.2	44.6	50.6	A	9.4	28 10.2	45.1	
9.1	56 35.9	1.3	A	9.5	44 34.7	33.8		9.4	39 38.6	11.0		9.4	44.7	29.6		7.3	29 38.7	32.9	A
9.5	57 40.4	37.0		9.4	49 6.6	59.9		9.4	42 4.6	30.7		9.4	10 4.8	6.2		9.5	47.8	9.7	
9.5	58 0.8	47.8		9.0	27.0	25.4		6.0	38.1	53.8	A	9.2	41.5	47.5		9.4	30 2.5	53.6	
9.5	42.5	37.9		9.1	59.3	6.3		8.3	38.1	12.0		8.5	53.5	24.2		9.5	14.6	6.6	
9.2	59 20.8	19.3		6.5	50 42.3	25.8	L	9.3	43 31.2	35.2	A	9.4	11 9.3	54.4		9.5	28.2	58.2	
6.5	27.6	51.1	A	9.4	57.4	31.9	B	8.8	44 0.0	21.8		8.8	11.0	53.1	B	9.5	36.3	53.5	
9.0	30.2	28.5		9.5	51 13.0	1.6		8.3	23.1	40.9	A	9.0	19.6	41.9		9.4	31 13.8	52.5	
9.3	39.2	48.9	B	8.8	52 9.6	18.5		8.6	45 5.1	34.6	A	9.0	20.9	7.6		9.5	31.6	47.7	
9.5	1 1.8	34.0		9.5	53 27.3	22.0		9.2	46 54.6	19.8	A	8.7	27.7	17.5		9.5	32 11.5	45.5	
9.3	2 8.4	19.2		9.2	55.8	12.5	B	6.8	48 31.1	39.9	A	9.5	47.4	35.6		9.5	23.1	59.7	
7.6	3 34.3	46.6	B	8.5	59.2	42.5		9.0	49 11.6	13.5		9.5	12 43.0	24.9		9.5	24.0	26.1	
9.5	55.3	28.5		9.0	54 2.0	2.4		9.0	38.1	43.6	A	9.5	44.0	25.5		9.5	33 24.7	26.5	
7.5	4 34.5	49.9		9.3	56.4	36.7		8.7	44.5	15.6		9.5	53.7	44.6		9.0	57.0	57.2	
9.5	48.0	6.2	A	9.4	56 24.1	36.7		9.4	53 0.0	54.7		9.5	13 16.4	27.5		9.5	34 22.8	29.1	
9.4	5 28.8	13.4	A	9.4	34.8	8.7	B	7.7	41.2	44.9	G	9.2	14 34.2	30.6		9.5	28.8	27.9	
9.5	7 58.2	4.5		7.5	58 15.1	27.5	A	9.2	54 40.4	6.5		8.7	46.9	47.3		8.5	31.9	32.2	A
9.5	8 23.9	50.0		9.4	28.6	46.4		9.3	42.0	0.2	B	8.4	51.7	19.5		8.5	33.2	51.8	
9.2	10 8.9	38.9	A	8.9	44.6	37.2	A	9.5	42.3	35.8		8.9	15 1.4	12.2		8.4	46.5	57.7	R
9.3	11 28.5	37.3		9.2	0 50.0	27.1	A	9.5	55 13.3	40.7		9.0	26.4	35.1		7.8	48.6	23.0	A
6.7	14 21.4	52.3	A	8.5	1 0.4	35.6	A	9.1	56 8.9	8.2		8.7	41.3	7.5		8.8	59.9	33.9	A
6.3	47.2	49.4	A	8.5	39.7	37.0	A	9.5	22.2	0.6		9.5	54.9	32.5		9.5	35 11.9	6.2	
9.5	15 1.3	44.5		8.2	46.7	8.2	A	6.6	41.6	28.0	A	8.6	56.0	9.0		9.5	28.7	9.5	
9.5	16 3.8	19.5		9.2	2 38.8	5.3	A	9.2	57 41.2	52.9		9.5	16 9.9	32.5		9.5	33.8	51.9	
9.5	17 9.0	54.8		9.1	48.7	41.2	A	9.0	58 10.4	17.9		7.0	13.6	41.3	A	9.5	36 1.1	35.9	
9.2	20 45.9	51.0		9.1	4 37.7	46.5	A	9.4	17.6	31.9		9.5	47.7	43.2		9.4	16.1	11.0	
9.5	55.5	17.0		8.5	50.6	44.0	A	7.8	22.8	46.6	A	9.5	17 2.9	23.3		9.5	21.4	19.0	
9.5	22 4.6	21.5		8.7	7 6.5	27.2		8.9	24.0	18.7		9.5	18.2	0.8		9.5	41.4	56.0	
9.3	15.8	31.8	B	9.5	29.7	31.8		9.4	28.0	22.2		9.0	43.4	34.5		8.8	37 34.8	29.4	R
9.0	17.7	52.2		9.3	53.0	21.5	B	9.5	34.3	43.6		9.5	52.0	51.8		6.5	58.0	10.2	A
9.1	19.5	38.7		9.0	8 20.3	6.2		9.4	59 15.6	53.3	B	8.4	18 17.9	35.0	A	9.1	58.0	10.5	
9.3	23 3.3	36.3		6.2	9 24.5	22.0	A	8.8	20.2	40.7	A	9.5	55.2	55.0		9.0	59.5	44.7	
6.5	50.2	10.2	J	8.0	49.2	35.4	L	9.4	26.3	59.3		9.4	19 0.0	50.4		9.1	38 2.3	16.1	B
9.0	24 6.5	34.7	A	9.2	10 0.5	6.9	A	9.2	36.5	1.6		8.9	20 21.5	13.9		9.4	9.8	27.3	
9.1	15.4	42.0	A	9.5	13 11.8	21.9		9.4	48.5	15.3		9.5	34.6	16.0		9.5	51.4	18.6	
9.4	28.8	24.9	A	9.2	30.7	9.0	A	9.5	1 5.2	17.4		9.5	50.4	47.1		9.1	56.6	3.0	
9.5	25 16.9	18.5		9.5	15 4.3	5.3		8.2	13.2	39.7	A	9.4	21 22.1	32.6		7.7	39 57.2	12.9	A
9.2	27 20.5	3.6	A	9.5	19.8	5.3		9.0	15.2	28.3		7.8	43.3	48.7	A	9.2	40 0.2	0.9	B
9.5	29 14.7	10.7		9.5	16 30.2	46.5		8.8	24.5	51.5	R	9.5	56.4	25.7		9.0	2.1	47.1	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	19°	+60°			19°—20°	+60°			20°	+60°			20°—21°	+60°			21°	+60°	
°	′ ″	′		°	′ ″	′		°	′ ″	′		°	′ ″	′		°	′ ″	′	
9.2	40 5.3	1.1		8.6	55 34.3	39.9		9.5	19 16.4	15.3		7.8	54 26.7	46.8	A	9.5	22 46.6	42.9	
9.4	7.1	47.4		9.5	36.4	41.6		9.5	52.1	10.0		9.5	52.3	1.0		8.8	23 14.1	32.1	
8.1	8.4	33.5	A	9.2	45.0	22.1		9.5	56.3	6.4		9.5	55 57.0	5.0		9.3	15.0	16.4	
9.5	41 37.5	36.7		9.5	56 0.4	46.8		9.5	20 47.0	11.8		8.5	56 11.5	33.0	A	9.5	24 15.6	11.5	
8.1	42 1.9	20.0	A	8.5	57 26.3	32.5		7.8	22 21.9	49.6	R	9.0	18.4	43.0	B	9.5	18.8	15.5	
8.3	54.3	4.0	A	8.3	33.0	15.2		9.5	23 40.3	4.9		9.3	24.3	6.4	A	9.5	20.0	12.2	
9.5	56.4	0.9		9.3	40.0	46.2		9.1	25 14.4	24.0		9.0	43.7	10.8		8.0	29.1	22.2	A
9.5	58 14.3	31.7		9.0	43.9	21.7		8.1	26 22.4	51.1	B	9.5	58.3	17.3		9.4	41.0	14.0	
9.3	21.2	28.6		9.3	54.8	49.7	B	9.2	32.5	29.0		9.1	57 2.0	14.3	A	9.5	49.2	16.3	
8.9	31.9	5.7	A	7.5	58 1.4	41.4	F	7.8	48.6	31.0	R	7.5	4.8	55.6	F	8.9	53.8	58.4	A
8.4	58.9	8.3	A	9.5	8.3	48.3		9.5	27 51.5	11.3		9.5	56.9	2.6		9.3	54.9	52.5	
9.5	44 2.6	13.5		8.2	8.8	6.6	B	8.5	59.0	36.5	R	9.5	58 4.8	26.7		6.9	25 16.0	47.9	A
8.5	31.4	5.7	A	8.1	59 33.0	59.1	F	9.5	28 33.6	16.2	B	8.8	43.6	20.3	A	9.5	26 26.5	41.0	
9.5	35.3	55.4		9.5	1 3.8	41.7		9.4	29 18.5	33.0		8.9	59 38.0	32.1		8.7	48.1	12.3	
9.5	45 22.4	34.2		8.0	8.3	37.9	R	8.5	38.7	42.8		9.5	0 45.1	47.9		9.1	27 24.6	58.6	
9.5	22.4	35.9		9.5	11.8	18.6		8.5	30 13.3	38.5	A	9.1	1 31.6	43.0		9.2	27.8	16.3	
9.3	25.0	47.0		9.5	49.3	58.3		9.4	28.0	1.5		9.1	33.6	85.6		9.3	32.7	18.9	
9.5	34.2	35.2		9.0	2 16.4	34.0		9.0	45.0	45.8	A	9.3	48.8	14.9		9.5	28 9.5	49.8	
8.9	41.1	51.5		9.0	19.4	29.7		7.0	34 17.5	51.2	A	9.2	2 59.8	13.8	B	9.5	14.9	46.3	
9.5	44.0	89.6		9.5	24.2	52.8		9.5	25.0	58.2		8.9	3 6.1	0.8		9.3	52.2	11.0	
9.3	48.5	36.9		9.4	28.3	52.1	B	9.1	29.3	43.7	A	9.2	10.3	18.5		9.5	29 12.5	58.3	
9.0	46 14.5	36.6		9.4	3 45.4	42.5		7.0	47.1	15.2	A	9.0	55.7	8.1		8.2	19.9	25.1	A
9.5	47 24.7	3.0		9.5	4 10.4	19.0		8.4	53.0	36.0	B	9.3	4 45.6	28.7		9.4	22.7	16.4	
9.5	30.0	38.7		9.0	14.9	16.1	R	9.2	35 9.5	0.5		9.5	53.4	5.8		9.3	30 5.9	31.1	
9.1	56.3	2.8	B	9.1	31.3	42.4		8.3	31.9	24.1	A	8.0	5 42.6	18.4	A	9.5	16.4	24.2	
6.1	48 7.7	50.4	A	9.3	38.7	18.0		9.0	37.0	30.0		9.5	6 36.8	58.7		9.5	16.8	8.0	
8.5	19.6	31.9	A	9.5	5 11.8	4.3		9.5	36 0.1	5.1		9.5	51.1	19.3		9.5	31 14.5	16.2	
8.6	13.5	1.6		9.0	25.8	43.0		9.3	9.4	4.1	B	9.5	7 31.0	28.1		9.4	20.6	2.5	
9.3	55.4	44.1		9.0	37.8	42.5		9.5	18.4	41.9		9.4	44.6	18.8		9.2	40.8	52.3	
9.5	49 0.9	33.4		9.5	6 3.9	25.0		9.4	38 4.0	45.2		9.5	9 14.0	6.8		9.5	32 32.9	13.5	
9.2	4.4	45.0		9.5	22.0	36.4		9.5	9.6	25.5		9.5	53.3	0.1		7.5	33 17.8	25.9	A
7.9	37.5	56.3	A	9.5	24.0	56.6		8.5	39 15.0	55.8		9.4	12 15.6	49.8		9.5	50.9	39.6	
8.3	38.4	18.7	A	9.0	49.4	37.2		9.5	23.7	46.2		9.0	13 46.9	15.9	B	9.2	56.8	57.0	
9.0	55.9	39.9	A	7.8	7 47.6	55.6	F	6.2	36.5	4.1	A	9.5	14 1.5	57.9		8.5	34 16.2	58.3	A
9.5	50 10.6	2.7		9.4	8 30.3	13.8		9.5	40 56.6	8.5		9.5	36.3	58.3		9.0	32.0	10.9	B
9.5	19.2	2.5		9.5	59.5	14.3		9.0	41 9.9	29.0		9.0	44.1	39.4	A	8.3	35 3.2	54.0	A
9.5	49.4	24.0		9.4	9 27.3	49.8		9.2	30.5	6.8		7.0	57.6	34.1	A	9.4	54.7	8.1	
9.5	51 6.5	29.0		9.4	51.8	0.9		9.5	42.0	38.3		8.6	15 28.9	14.9	A	8.3	36 13.9	51.1	A
9.5	14.4	20.9		6.0	10 47.8	12.7	G	9.5	58.3	30.8	B	8.8	26.4	53.5		9.4	23.1	6.8	B
9.5	16.4	49.2		9.0	11 9.8	34.4	E	9.1	42 45.1	5.2	A	9.5	16 6.4	17.4		9.5	36.5	19.9	
9.5	20.0	33.7		9.1	24.3	19.9		9.5	43 8.0	1.4		9.1	27.9	33.3		9.5	37 17.0	33.6	
9.4	32.9	24.8		9.0	39.2	26.1	B	9.1	31.6	30.0	A	9.1	31.0	30.7	A	9.5	33.8	21.1	R
9.4	49.3	20.7		9.0	12 32.8	23.5		9.5	44 18.8	0.2		8.0	32.0	1.2	A	9.4	47.5	2.2	
9.5	52 12.2	1.7		9.2	41.3	42.5		9.1	20.9	51.6	A	6.5	41.2	4.3	A	9.5	55.7	31.6	
6.8	21.8	26.3	A	9.5	14 4.0	45.0	B	9.5	49.0	48.7		8.5	42.4	22.2	A	7.9	40 6.8	13.0	F
8.6	25.2	13.6	A	8.5	10.3	29.5	F	9.5	45 10.6	52.2		8.2	43.1	30.6	A	9.5	32.9	58.7	
9.2	53 0.4	28.4		9.5	53.7	55.7		9.5	21.3	12.2		6.8	52.0	9.1	A	9.2	44.2	55.3	R
9.4	9.4	25.5		9.4	16 0.8	19.1		9.5	49.0	17.3		8.8	17 19.5	51.3	A	4.5	41 17.3	26.2	G
9.2	12.4	52.0	A	8.0	12.2	9.6	F	8.0	50.7	35.5	A	8.3	35.0	5.5	A	9.3	27.4	33.5	
8.8	13.3	9.0		9.4	26.5	35.9	B	8.7	46 25.3	8.7	A	9.5	51.6	39.4		8.0	56.8	23.9	B
8.7	20.7	20.9		9.5	37.9	35.4		9.5	47 35.2	50.8		8.8	19 15.9	27.3		8.8	43 0.8	18.3	
9.4	29.0	37.4		8.5	40.8	49.8		8.7	48 52.5	55.2		9.5	28 6	43.0		9.2	7.7	56.6	A
9.5	30.2	0.5		9.5	18 11.7	26.0		8.5	49 33.0	8.9	A	7.3	20 26.6	10.9	A	8.5	11.0	53.8	A
8.5	38.7	53.0	A	9.0	13.1	12.4		9.2	38.2	25.6		8.0	34.1	38.9	A	6.0	11.0	1.8	A
9.4	54 19.2	58.9		9.2	13.3	57.5		8.8	51 3.4	25.6	A	9.5	43.2	42.0		9.2	30.8	16.3	B
8.5	55 7.4	6.1		9.0	16.9	21.7		9.4	49.5	59.5		9.4	21 16.6	47.6		8.9	40.9	39.0	
9.5	16.0	42.4		8.5	17.4	35.4	R	8.8	52 21.0	16.3	A	9.3	21.3	53.4	B	8.9	42.7	29.1	
8.2	17.2	15.0	B	8.3	21.8	4.1	A	9.2	21.2	56.9	A	9.4	30.1	8.0		9.2	44 16.8	56.8	A
8.1	17.9	11.0	B	9.3	23.7	16.3		7.9	40.3	59.9	A	9.2	31.3	0.2	A	9.4	22.8	22.9	R
7.1	33.0	27.3	F	8.7	19 2.8	3.5	A	8.8	54 3.9	19.8	A	8.3	22 35.9	56.6		8.5	45 6.4	35.6	A

1501—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	16h—17h	+60°			17h—18h	+60°			18h—19h	+60°			19h	+60°			19h	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	44 46.4	16.6		9.1	29 42.3	2.4	A	9.2	17 25.2	44.7		9.0	1 30.7	8.5		9.4	21 57.4	37.5	
9.2	45 21.4	7.3		9.4	30 52.0	52.3	A	9.2	34.0	46.8		9.5	2 43.7	34.2		9.5	58.3	2.8	
9.0	32.7	29.4		9.4	31 1.5	58.2		9.2	51.6	43.4		9.5	3 10.9	49.6		7.5	22 1.9	3.7	A
9.0	33.7	10.7	B	8.0	32 19.8	10.7	A	8.8	18 29.2	50.9		8.6	34.7	14.4	A	6.8	11.1	54.9	A
9.5	47.9	42.6		9.5	33 31.7	33.3		9.4	20 13.8	53.0		9.5	55.7	14.9		9.4	17.3	2.8	
8.0	47 14.1	22.8	B	9.3	50.9	5.3		9.5	49.4	55.6		8.8	4 1.9	20.4		9.5	24.2	45.9	
9.3	43.8	37.1		9.2	34 27.3	22.4		8.2	24 6.0	23.4	B	9.3	58.6	52.5		9.5	23 9.2	21.8	
8.8	48 21.3	19.5		8.9	35 24.8	42.5		9.3	50.8	32.7		9.0	5 37.4	3.7		9.2	22.4	25.4	
9.4	49 10.0	33.7		8.9	36 20.3	6.2		9.0	25 1.6	14.0	A	9.1	46.9	37.7		8.9	23.5	41.0	
8.3	59.8	44.5	A	9.5	38 31.5	30.8		9.3	44.5	1.2		9.5	6 23.5	20.2		9.1	24 2.2	9.9	
9.5	50 16.4	43.0		9.4	37.0	12.8		9.5	26 4.7	47.4		8.9	24.6	50.0	R	9.5	33.8	34.9	
9.5	51 46.4	10.6	A	9.5	37.4	8.8	B	8.0	42.1	20.3	L	8.7	25.7	33.3	B	9.4	39.3	23.7	
6.5	52 4.7	36.2	A	9.3	40.6	50.3		9.5	27 47.6	41.0		7.7	29.1	32.7	B	9.5	43.8	6.2	
9.2	19.6	47.6	A	8.9	43.7	2.5	B	9.5	30 48.8	16.4		9.5	7 5.4	9.7		9.4	25 45.2	41.7	
9.0	25.8	5.3	A	8.5	39 47.8	25.4	L	9.2	31 56.6	12.5	A	9.0	24.3	14.6		9.5	26 11.7	37.7	
9.5	35.9	18.3	B	9.5	41 5.9	31.8		9.5	33 31.2	24.3		9.1	31.0	30.0		9.5	30.9	12.7	
9.5	37.0	19.4	B	9.5	20.4	50.5		9.0	42.6	32.7	A	9.4	44.3	49.6	B	9.5	32.5	27.5	
9.5	53 12.2	7.7		9.2	55.8	20.2	B	9.4	42.6	8.1		8.4	8 11.3	4.1	A	9.1	58.3	22.4	
9.5	54 36.9	50.9		9.3	42 22.6	36.1		9.0	34 18.6	54.3	A	9.5	11.9	8.8		7.0	27 21.8	22.0	B
9.3	36.9	36.9		8.5	44.8	38.1	A	6.8	36 38.6	33.7	G	9.4	9 6.6	3.5		9.3	38.0	17.0	
8.8	55 17.0	1.0	A	7.8	58.5	20.9	A	9.2	40.5	53.2	A	9.1	27.2	17.4		9.5	53.2	46.4	
9.0	42.9	40.8	A	9.3	43 8.3	50.5		9.3	37 31.7	20.9		8.2	44.6	50.6	A	9.4	28 10.2	45.1	
9.1	56 35.9	1.3	A	9.5	44 34.7	33.8		9.4	39 38.6	11.0		9.4	44.7	29.6		7.3	29 38.7	32.9	A
9.5	57 40.4	37.0		9.4	49 6.6	59.9		9.4	42 4.6	30.7		9.4	10 4.8	6.2		9.5	47.8	9.7	
9.5	58 0.8	47.8		9.0	27.0	25.4		6.0	38.1	53.8	A	9.2	41.5	47.5		9.4	30 2.5	53.6	
9.5	42.5	37.9		9.1	59.3	6.3		8.3	38.1	12.0		8.5	53.5	24.2		9.5	14.6	6.6	
9.2	59 20.8	19.3		6.5	50 42.3	25.8	L	9.8	43 31.2	35.2	A	9.4	11 9.3	54.4		9.5	28.2	58.2	
6.5	27.6	51.1	A	9.4	57.4	31.9	B	8.8	44 0.0	21.8		8.8	11.0	53.1	B	9.5	36.3	53.5	
9.0	30.2	28.5		9.5	51 13.0	1.6		8.3	23.1	40.9	A	9.0	19.6	41.9		9.4	31 13.8	52.5	
9.3	0 39.2	48.9	B	8.8	52 9.6	18.5		8.6	45 5.1	34.6	A	9.0	20.9	7.6		9.5	31.6	47.7	
9.5	1 1.8	34.0		9.5	53 27.3	22.0		9.2	46 54.6	19.8	A	8.7	27.7	17.5		9.5	32 11.5	45.5	
9.3	2 8.4	19.2		9.3	55.8	12.5	B	6.8	48 31.1	39.9	A	9.5	47.4	35.6		9.5	23.1	59.7	
7.6	3 34.3	46.6	B	8.5	59.2	42.5		9.0	49 11.6	13.5		9.5	12 43.0	24.9		9.5	24.0	26.1	
9.5	55.3	28.5		9.0	54 2.0	2.4		9.0	38.1	43.6	A	9.5	44.0	25.5		9.5	33 24.7	26.5	
7.5	4 34.5	49.9		9.3	56.4	36.7		8.7	44.5	15.6		9.5	53.7	44.6		9.0	57.0	57.2	
9.5	48.0	6.2	A	9.4	56 24.1	36.7		9.4	53 0.0	54.7		9.5	13 16.4	27.5		9.5	34 22.8	29.1	
9.4	5 28.8	13.4	A	9.4	34.8	8.7	B	7.7	41.2	44.9	G	9.2	14 34.2	30.6		9.5	28.8	27.9	
9.5	7 58.2	4.5		7.5	58 15.1	27.5	A	9.2	54 40.4	6.5		8.7	46.9	47.3		8.5	31.9	32.2	A
9.5	8 23.9	50.0		9.4	28.6	46.4		9.3	42.0	0.2	B	8.4	51.7	19.5		8.5	33.2	51.8	
9.2	10 8.9	38.9	A	8.9	44.6	37.2	A	9.5	42.3	35.8		8.9	15 1.4	12.2		8.4	46.5	57.7	R
9.3	11 28.5	37.3		9.2	0 50.0	27.1	A	9.5	55 13.3	40.7		9.0	26.4	35.1		7.8	48.6	23.0	A
6.7	14 21.4	52.3	A	8.5	1 0.4	36.6	A	9.1	56 8.9	8.2		8.7	41.3	7.5		8.8	59.9	33.9	A
6.3	47.2	49.4	A	8.5	39.7	37.0	A	9.5	22.2	0.6		9.5	54.9	32.5		9.5	35 11.9	6.2	
9.5	15 1.3	44.5		8.2	46.7	8.2	A	6.6	41.6	28.0	A	8.6	56.0	9.0		9.5	28.7	9.5	
9.5	16 3.8	19.5		9.2	2 38.8	5.3	A	9.2	57 41.2	52.9		9.5	16 9.9	32.5		9.5	33.8	51.9	
9.5	17 9.0	54.8		9.1	48.7	41.2	A	9.0	58 10.4	17.9		7.0	13.6	41.3	A	9.5	36 1.1	35.9	
9.2	20 45.9	51.0		9.1	4 37.7	46.5	A	9.4	17.6	31.9		9.5	47.7	43.2		9.4	16.1	11.0	
9.5	55.5	17.0		8.5	50.6	44.0	A	7.8	22.8	46.6	A	9.5	17 2.9	23.3		9.5	21.4	19.0	
9.5	22 4.6	21.5		8.7	7 6.5	27.2		8.9	24.0	18.7		9.5	18.2	0.8		9.5	41.4	56.0	
9.3	15.8	31.8	B	9.5	29.7	31.8		9.4	28.0	22.2		9.0	43.4	34.5		8.8	37 34.8	29.4	R
9.0	17.7	52.2		9.3	53.0	21.5	B	9.5	34.3	43.6		9.5	52.0	51.8		6.5	58.0	10.2	A
9.1	19.5	38.7		9.0	8 20.3	6.2		9.4	59 15.6	53.3	B	8.4	18 17.9	36.0	A	9.1	58.0	10.5	
9.3	23 3.3	36.3		6.2	9 24.5	22.0	A	8.8	20.2	40.7	A	9.5	55.2	55.0		9.0	59.5	44.7	
5.5	50.2	10.2	J	8.0	49.2	35.4	L	9.4	26.3	59.3		9.4	19 0.0	50.4		9.1	38 2.3	16.1	B
9.0	24 6.5	34.7	A	9.2	10 0.5	6.9	A	9.2	36.5	1.6		8.9	20 21.5	13.9		9.4	9.8	27.3	
9.1	15.4	42.0	A	9.5	13 11.8	21.9		9.4	48.5	15.3		9.5	34.6	16.0		9.5	51.4	18.6	
9.4	28.8	24.9	A	9.2	30.7	9.0	A	9.5	1 5.2	17.4		9.5	50.4	47.1		9.1	56.6	3.0	
9.5	25 16.9	18.5		9.5	15 4.3	5.3		8.2	13.2	39.7	A	9.4	21 22.1	32.6		7.7	39 57.2	12.9	A
9.2	27 20.5	3.6	A	9.5	19.8	5.3		9.0	15.2	28.3		7.8	43.3	48.7	A	9.2	40 0.2	0.9	B
9.5	29 14.7	10.7		9.5	16 30.2	46.5		8.8	24.5	51.5	R	9.5	56.4	25.7		9.0	2.1	47.1	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	19°		+60°		19°—20°		+60°		20°		+60°		20°—21°		+60°		21°		+60°
m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′	m	′	″	′
9.2	40	5.3	1.1	8.6	55	34.3	39.9	9.5	19	16.4	15.3	7.8	54	26.7	46.8 A	9.5	22	46.6	42.9
9.4		7.1	47.4	9.5		36.4	41.6	9.5		52.1	10.0	9.5		52.3	1.0	8.8	23	14.1	32.1
8.1		8.4	33.5 A	9.2		45.0	22.1	9.5		56.3	6.4	9.5	55	57.0	5.0	9.3		15.0	16.4
9.5	41	37.5	36.7	9.5	56	0.4	46.8	9.5	20	47.0	11.8	8.5	56	11.5	33.0 A	9.5	24	15.6	11.5
8.1	42	1.9	20.0 A	8.5	57	26.3	32.5	7.8	22	21.9	49.6 R	9.0		18.4	43.0 B	9.5		18.8	15.5
8.3		54.3	4.0 A	8.3		33.0	15.2	9.5	23	40.3	4.9	9.3		24.3	6.4 A	9.5		20.0	12.2
9.5		56.4	0.9	9.3		40.0	46.2	9.1	25	14.4	24.0	9.0		43.7	10.8	8.0		29.1	22.2 A
9.5	48	14.3	31.7	9.0		43.9	21.7	8.1	26	22.4	51.1 B	9.5		58.3	17.3	9.4		41.0	14.0
9.3		21.2	28.6	9.3		54.8	49.7 B	9.2		32.5	29.0	9.1	57	2.0	14.3 A	9.5		49.2	16.3
8.9		31.9	5.7 A	7.5	58	1.4	41.4 F	7.8		48.6	31.0 R	7.5		4.8	55.6 F	8.9		53.8	58.4 A
8.4		58.9	8.3 A	9.5		8.3	48.3	9.5	27	51.5	11.3	9.5		56.9	2.6	9.3		54.9	52.5
9.5	44	2.6	13.5	8.2		8.8	6.6 B	8.5		59.0	36.5 R	9.5	58	4.6	26.7	6.9	25	16.0	47.9 A
8.5		31.4	5.7 A	8.1	59	33.0	59.1 F	9.5	28	33.6	16.2 B	8.8		43.6	20.3 A	9.5	26	26.5	41.0
9.5		35.3	55.4	9.5	1	3.8	41.7	9.4	29	18.5	33.0	8.9	59	38.0	32.1	8.7		48.1	12.3
9.5	45	22.4	34.2	8.0		8.3	37.9 R	8.5		38.7	42.8	9.5	0	45.1	47.9	9.1	27	24.6	58.6
9.5		22.4	35.9	9.5		11.8	18.6	8.5	30	13.3	38.5 A	9.1	1	31.6	43.0	9.2		27.8	16.3
9.3		25.0	47.0	9.5		49.3	58.3	9.4		28.0	1.5	9.1		33.6	35.6	9.3		32.7	18.9
9.5		34.2	35.2	9.0	2	16.4	34.0	9.0		45.0	45.8 A	9.3		48.8	14.9	9.5	28	9.5	49.8
8.9		41.1	51.5	9.0		19.4	29.7	7.0	34	17.5	51.2 A	9.2	2	59.8	13.8 B	9.5		14.9	46.3
9.5		44.0	39.6	9.5		24.2	52.8	9.5		25.0	58.2	8.9	3	6.1	0.8	9.3		52.2	11.0
9.3		48.5	36.9	9.4		28.3	52.1 B	9.1		29.3	43.7 A	9.2		10.3	18.5	9.5	29	12.5	58.3
9.0	46	14.5	36.6	9.1	3	45.4	42.5	7.0		47.1	15.2 A	9.0		55.7	8.1	8.2		19.9	25.1 A
9.5	47	24.7	3.0	9.5	4	10.4	19.0	8.4		53.0	36.0 B	9.3	4	45.6	28.7	9.4		22.7	16.4
9.5		30.0	38.7	9.0		14.9	16.1 R	9.2	35	9.5	0.5	9.5		53.4	5.8	9.3	30	5.9	31.1
9.1		56.3	2.8 B	9.1		31.3	42.4	8.3		31.9	24.1 A	8.0	5	42.6	18.4 A	9.5		16.4	24.2
6.1	48	7.7	50.4 A	9.3		38.7	18.0	9.0		37.0	30.0	9.5	6	36.8	58.7	9.5		16.8	8.0
8.5		10.6	31.9 A	9.5	5	11.8	4.3	9.5	36	0.1	5.1	9.3		51.1	19.3	9.5	31	14.5	16.2
8.6		13.5	1.6	9.0		25.8	43.0	9.3		9.4	4.1 B	9.5	7	31.0	28.1	9.4		20.6	2.5
9.3		55.4	44.1	9.0		37.8	42.5	9.5		18.4	41.9	9.4		44.6	18.8	9.2		40.8	52.3
9.5	49	0.9	33.4	9.5	6	3.9	25.0	9.4	38	4.0	45.2	9.5	9	14.0	6.8	9.5	32	32.9	13.5
9.2		4.4	45.0	9.5		22.0	36.4	9.5		9.6	25.5	9.5		53.3	0.1	7.5	33	17.6	25.9 A
7.9		39.5	56.3 A	9.5		24.0	56.6	8.5	39	15.0	55.8	9.4	12	15.6	49.8	9.5		50.9	39.6
8.3		38.4	18.7 A	9.0		49.4	37.2	9.5		23.7	46.2	9.0	13	46.9	15.9 B	9.2		56.8	57.0
9.0		55.9	39.9 A	7.8	7	47.6	55.6 F	6.2		36.5	4.1 A	9.5	14	1.5	57.9	8.5	34	16.2	58.3 A
9.5	50	10.6	2.7	9.4	8	30.3	13.8	9.5	40	56.5	8.5	9.5		36.3	58.3	9.0		32.0	10.9 B
9.5		19.2	2.5	9.5		59.5	14.3	9.0	41	9.9	29.0	9.0		44.1	39.4 A	8.3	35	3.2	54.0 A
9.5		49.4	24.0	9.4	9	27.3	49.8	9.2		30.5	6.8	7.0		57.6	34.1 A	9.4		54.7	8.1
9.5	51	6.5	29.0	9.4		51.8	0.9	9.5		42.0	38.3	8.6	15	23.9	14.9 A	8.3	36	13.9	51.1 A
9.5		14.4	20.9	6.0	10	47.8	12.7 G	9.5		58.3	30.8 B	8.8		26.4	53.5	9.4		23.1	6.8 B
9.5		16.4	49.2	9.0	11	9.8	34.4 R	9.1	42	45.1	5.2 A	9.5	16	6.4	17.4	9.5		36.5	19.9
9.5		20.0	33.7	9.1		24.3	19.9	9.5	43	8.0	1.4	9.1		27.9	33.3	9.5	37	17.0	33.6
9.4		32.9	24.8	9.0		39.2	26.1 B	9.1		31.6	30.0 A	9.1		31.0	30.7 A	9.5		33.8	21.1 R
9.4		49.3	20.7	9.0	12	32.8	23.5	9.5	44	18.8	0.2	8.0		32.0	1.2 A	9.4		47.5	2.2
9.5	52	12.2	1.7	9.2		41.3	42.5	9.1		20.9	51.6 A	6.5		41.2	4.3 A	9.5		55.7	31.6
6.8		21.8	26.3 A	9.5	14	4.0	45.0 B	9.5		49.0	48.7	8.5		42.4	22.2 A	7.9	40	6.8	13.0 F
6.6		25.2	13.6 A	8.5		10.3	29.5 F	9.5	45	10.6	52.2	8.2		43.1	30.6 A	9.5		32.9	58.7
9.2	53	0.4	28.4	9.5		53.7	55.7	9.5		21.3	12.2	6.8		52.0	9.1 A	9.2		44.2	55.3 R
9.4		9.4	25.5	9.4	16	0.8	19.1	9.5		49.0	17.3	8.8	17	19.5	51.3 A	4.5	41	17.3	26.2 G
9.2		12.4	52.0 A	8.0		12.2	9.6 F	8.0		50.7	35.5 A	8.3		35.0	5.5 A	9.3		27.4	33.5
8.8		13.3	9.0	9.4		26.5	35.9 B	8.7	46	25.3	8.7 A	9.5		51.6	39.4	8.0		56.8	23.9 B
8.7		20.7	20.9	9.5		37.9	35.4	9.5	47	35.2	50.8	8.8	18	15.9	27.3	8.8	43	0.8	18.3
9.4		29.0	37.4	8.5		40.8	49.8	8.7	48	52.5	55.2	9.5		28.6	43.0	9.2		7.7	56.6 A
9.5		30.2	0.5	9.5	18	11.7	26.0	8.5	49	33.0	8.9 A	7.3	20	26.6	10.9 A	8.5		11.0	53.8 A
8.5		38.7	53.0 A	9.0		13.1	12.4	9.2		38.2	25.6	8.0		34.1	38.9 A	6.0		11.0	1.8 A
9.4	54	19.2	58.9	9.2		13.3	57.5	8.8	51	3.4	25.6 A	9.5		43.2	42.0	9.2		30.8	16.3 B
8.5	55	7.4	6.1	9.0		16.9	21.7	9.4		49.5	59.5	9.4	21	16.6	47.6	8.9		40.9	39.0
9.5		16.0	42.4	8.5		17.4	35.4 R	8.8	52	21.0	16.3 A	9.3		21.3	53.4 B	8.9		42.7	29.1
8.2		17.2	16.0 B	8.3		21.8	4.1 A	9.2		21.2	56.9 A	9.4		30.1	8.0	9.2	44	16.8	56.8 A
8.1		17.9	11.0 B	9.3		23.7	16.3	7.9		40.3	59.9 A	9.2		31.3	0.2 A	9.4		22.8	22.9 R
7.1		33.0	27.3 F	8.7	19	2.8	3.5 A	8.8	54	3.9	19.8 A	8.3	22	35.9	56.6	6.5	45	6.4	35.6 A

2201—2260			
	20ᵐ	+59°	
m	′ ″	′	
9.0	10 16.0	50.9	
9.3	28.9	39.9	
9.3	57.9	39.3	
9.3	11 20.8	11.5	
9.0	50.5	14.1	
8.5	56.5	10.5	
9.3	12 15.3	54.4	
9.0	20.9	26.2	
8.8	13 11.9	19.0	
9.0	21.1	40.4	
8.3	14 39.3	17.0	
8.3	50.2	51.3	R
8.9	58.0	20.5	
9.0	15 53.6	45.9	
8.9	58.4	2.2	
9.0	16 4.3	2.4	
9.5	11.8	58.9	
9.5	17 10.9	41.4	
9.4	14.5	7.2	
8.5	54.4	58.4	A
9.4	19 31.7	7.6	
8.4	20 17.2	18.5	F
9.0	38.8	1.4	R
8.0	21 34.0	49.0	A
9.4	34.3	39.6	
8.6	36.4	36.3	
8.0	58.4	52.3	A
6.4	22 3.9	7.6	A
9.1	4.7	17.3	B
8.3	18.2	56.9	A
7.5	20.2	31.7	A
8.6	23.8	59.5	A
9.4	25.8	19.4	
7.3	45.9	41.6	A
9.5	52.1	9.5	
8.4	23 0.8	31.6	A
9.5	25.6	37.1	
9.4	24 15.3	28.7	
9.3	42.2	44.6	A
7.4	25 0.5	15.3	A
9.5	8.4	51.9	
8.0	28.3	45.6	A
9.2	49.4	9.0	
9.5	26 8.8	4.9	
9.0	15.8	16.4	A
7.8	23.5	55.9	A
9.5	30.0	31.2	
9.5	34.2	51.0	
9.5	52.0	48.4	
9.5	27 35.0	48.7	
8.0	58.8	23.2	A
8.0	28 14.8	14.8	A
9.4	22.7	29.7	B
7.5	51.8	34.6	A
9.4	52.3	40.7	
9.5	29 0.4	49.3	
6.8	6.6	56.9	G
9.5	31.3	48.0	
9.2	30 1.9	6.0	B
9.5	18.3	24.2	

2261—2320			
	20ᵐ—21ᵐ	+59°	
m	′ ″	′	
9.5	31 11.3	15.8	
9.5	29.8	46.0	
9.3	32 33.9	18.9	
8.7	59.6	10.2	
9.4	33 28.0	54.9	
9.5	35 28.3	24.7	
9.2	36 14.3	19.4	
9.0	20.1	3.9	A
9.3	20.8	3.5	B
8.0	42.9	11.1	A
9.1	45.9	51.0	
6.2	37 12.9	59.5	A
9.5	49.8	51.0	
9.5	38 16.6	41.2	
9.4	21.1	28.0	
9.0	56.3	14.9	
9.5	40 32.8	3.7	
9.4	41.8	57.2	
9.4	41 11.5	53.4	
8.7	14.6	49.8	B
9.5	42 0.9	47.1	
9.5	47.3	1.7	
8.2	43 20.6	19.9	B
9.4	47.6	31.6	
7.9	51.6	34.0	B
9.5	45 44.6	15.0	
9.5	47 12.3	7.7	
9.4	24.9	19.3	
9.4	48.9	18.8	
9.1	48 39.5	50.1	A
8.0	46.2	50.0	A
9.0	58.4	49.2	B
9.0	49 38.8	23.2	
9.3	51 0.1	24.6	
9.4	16.0	59.0	
7.5	52 11.6	28.0	A
9.4	55.7	45.9	
9.0	53 26.5	1.1	A
9.4	46.1	1.0	
9.1	54 0.4	13.2	B
9.3	10.2	20.4	
9.2	35.0	27.2	
9.4	39.2	37.9	B
9.4	59.9	25.1	
8.9	55 20.3	56.1	
9.1	56 10.3	16.7	
9.5	57 38.6	18.7	
9.3	59.1	47.7	
9.0	58 54.0	40.5	A
8.8	59 8.1	28.1	A
9.5	36.9	1.7	B
8.8	0 0.6	35.6	
7.0	1 6.8	40.4	A
9.2	42.0	11.6	
8.8	2 2.4	54.2	
9.1	26.6	30.6	
9.3	35.1	5.4	
9.3	57.8	13.7	
8.8	3 8.4	4.8	
7.5	20.2	17.7	A

2321—2380			
	21ᵐ	+59°	
m	′ ″	′	
9.5	3 27.0	51.7	
8.7	44.1	57.5	A
9.4	4 58.6	42.0	B
9.4	5 18.8	9.7	
9.5	6 13.4	13.2	
9.0	44.0	52.2	
8.2	46.3	36.5	A
9.5	47.3	39.9	B
9.5	50.9	40.4	
9.1	7 15.1	28.6	
8.8	21.4	38.5	A
9.3	41.2	19.7	A
8.5	58.0	21.9	A
6.0	8 8.8	22.1	A
9.5	11.2	55.7	
9.4	11.8	24.2	B
8.8	15.6	6.5	B
9.4	16.9	10.7	
9.5	35.1	47.9	
9.4	37.0	56.8	
9.3	9 1.4	56.0	B
7.5	9.0	31.3	A
9.4	43.7	58.5	
8.5	10 59.9	10.0	R
9.5	11 15.6	50.4	
8.6	23.4	59.2	A
8.6	13 20.1	41.0	A
9.0	27.3	4.8	
9.3	33.3	22.8	B
9.2	44.6	29.1	A
9.4	53.5	57.2	
8.9	14 50.1	50.9	B
9.4	54.1	38.0	
8.3	15 3.9	1.0	
9.5	24.6	14.6	
9.0	29.7	21.2	A
9.0	16 35.1	55.3	
9.5	47.2	20.7	
8.5	48.3	49.8	A
8.9	17 17.2	31.9	B
8.8	34.8	38.8	
7.7	47.3	57.5	A
9.3	48.7	48.9	
9.3	18 30.6	46.5	
9.2	35.4	38.7	
9.2	49.9	45.9	
9.5	19 34.5	40.7	
9.0	38.9	13.7	A
9.4	41.0	57.2	
9.3	49.3	37.9	B
8.6	20 17.6	8.4	A
9.2	26.1	7.5	
9.4	47.0	16.7	
8.9	21 15.8	40.0	A
9.3	49.6	19.7	
9.0	56.2	27.1	A
9.0	22 5.2	31.5	A
9.4	17.0	13.8	B
9.3	23 1.1	42.0	B
8.7	14.2	55.8	A

2381—2440			
	21ᵐ	+59°	
m	′ ″	′	
9.0	23 17.6	15.7	
9.5	18.4	46.0	
6.4	26.0	7.4	G
8.8	24 28.4	36.5	A
9.2	25 2.1	11.6	
9.5	37.1	8.3	
7.3	49.6	44.4	A
9.5	26 7.7	35.0	
9.5	16.7	28.6	
8.9	19.4	50.7	A
9.2	21.9	6.6	B
9.3	33.6	16.7	
8.8	43.5	44.4	A
9.4	49.7	37.0	
5.7	27 1.4	49.4	A
7.2	29 36.2	40.5	A
9.5	34.9	58.2	
8.6	55.9	50.8	A
8.5	30 41.2	2.1	A
9.5	31 14.9	21.7	
9.5	32 9.4	53.8	
9.5	20.0	17.2	
9.3	47.4	20.7	
8.9	57.4	15.7	A
9.5	33 0.9	49.8	
9.5	33.5	39.5	
9.5	35 8.9	36.5	
9.4	36 5.4	45.1	A
6.9	17.9	5.7	A
9.3	49.8	35.2	B
9.5	38 2.9	7.3	
9.0	32.9	38.0	
9.4	55.4	57.8	
9.5	40 13.5	23.6	
8.9	18.5	3.3	
9.0	41 18.2	50.8	
9.4	30.0	22.6	
9.3	42 36.3	56.8	
9.0	58.1	7.9	
7.0	43 14.6	1.8	A
9.4	46.3	10.6	B
9.4	44 9.3	53.5	
9.4	45 32.4	31.6	
7.8	45.9	29.6	A
9.0	47 6.9	46.3	
9.5	18.4	59.2	
7.7	20.9	15.0	B
7.8	48 0.8	38.5	P
9.5	13.9	24.6	
7.7	37.6	57.2	A
9.0	47.2	42.9	
8.6	50 40.4	17.5	
9.5	51 0.3	56.2	
9.5	3.9	58.8	
7.7	24.2	8.3	A
7.0	54.6	6.3	A
8.6	52 4.0	18.7	A
9.5	26.8	29.6	
9.3	55.0	20.5	B
9.4	53 28.2	16.2	

2441—2500			
	21ᵐ—22ᵐ	+59°	
m	′ ″	′	
9.2	54 18.0	16.2	
7.8	26.9	22.1	A
7.5	43.9	37.0	A
9.2	55 0.6	3.1	
7.9	14.9	51.1	A
8.8	45.8	45.7	A
9.2	48.4	55.2	
8.6	56 52.5	52.9	A
9.5	57 7.7	19.8	
8.4	32.4	32.3	A
9.4	42.5	11.7	
8.9	58 25.3	27.3	A
9.5	30.7	13.7	
8.7	44.8	29.5	A
9.2	59.8	40.6	
6.6	59 11.6	6.6	A
9.3	17.3	7.9	B
9.4	19.0	26.9	
6.8	29.7	9.9	A
8.1	32.4	51.6	A
7.9	33.3	7.7	B
9.1	42.5	21.7	
8.0	42.8	13.0	A
8.5	0 6.4	1.3	A
8.2	1 51.4	57.5	A
8.6	2 21.3	55.0	A
9.0	28.0	32.6	A
8.9	28.4	29.7	A
9.2	34.6	27.1	
8.5	54.2	58.8	A
9.5	4 6.0	25.6	
9.5	17.7	28.8	
9.2	22.5	37.1	
9.5	56.2	27.7	
8.0	5 11.0	58.8	R
9.3	12.2	13.4	
8.3	23.4	19.4	B
9.4	28.1	13.5	
9.4	35.1	13.5	
9.5	42.3	54.3	B
9.0	6 52.6	17.5	
7.6	55.2	0.2	S
9.5	57.2	34.3	
9.5	7 4.4	59.8	B
7.6	11.1	22.5	B
8.9	36.6	45.1	
9.3	41.8	31.1	
8.8	52.9	30.1	B
9.5	8 0.9	46.8	
9.5	17.2	34.2	
9.4	23.5	16.0	
9.5	35.9	50.2	
9.3	42.6	30.7	A
9.5	9 20.5	15.3	
9.0	37.5	5.4	
9.5	42.3	16.7	
9.5	56.8	54.1	
9.2	10 18.1	9.2	
9.5	50.2	49.9	
9.3	11 55.6	51.2	

2501—2560				2561—2620				2621—2680				2681—2740				2741—2800			
	22h	+59°			22h	+59°			22h—23h	+59°			23h	+59°			23h	+59°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	12 16.5	41.0		8.0	36 38.3	9.9	A	9.5	55 2.8	58.3		9.5	8 50.4	6.4		9.5	25 33.8	44.4	
9.5	51.4	23.4		9.2	38 0.9	21.5		9.5	21.8	56.9		9.5	52.4	37.7		9.5	26 6.6	38.0	
9.2	53.2	54.0		9.0	28.4	43.2		9.1	29.4	38.8		9.0	56.9	39.5		9.0	14.9	48.3	A
9.2	59.0	24.9		9.1	39 29.0	7.4		8.8	34.6	54.6		9.2	9 23.1	8.0		7.7	37.0	37.4	F
9.2	13 29.6	25.9		9.3	32.5	4.8		7.3	43.3	25.0	G	8.4	26.2	53.1		7.0	53.0	14.5	F
6.8	14 25.1	25.2	B	9.5	55.3	20.0		8.8	44.6	44.3		9.1	39.0	25.5		7.6	53.0	38.9	F
9.5	15 6.1	38.8		9.5	40 27.1	51.4		9.5	56 4.4	2.1		9.0	40.0	21.7		9.5	53.1	47.8	
8.8	32.0	8.7		8.0	41 18.9	51.5	A	9.2	13.6	10.9	B	9.2	41.4	31.2		9.5	27 3.5	39.1	
8.0	38.3	21.4	A	8.0	24.7	59.4	A	7.0	24.5	4.5	G	9.5	10 17.1	6.6		9.4	30 40.3	34.4	
9.5	42.4	19.3		9.5	52.7	8.0		9.2	57 19.8	39.9	B	9.1	38.3	9.8		9.5	51.3	18.5	
9.0	17 6.8	14.6	A	9.5	56.7	0.6		6.7	25.4	39.9	G	9.5	50.0	10.5		8.8	50.0	34.9	
9.5	18 22.9	30.4		8.5	42 19.1	22.2		9.5	36.9	12.4		9.3	11 7.3	27.6		9.1	57.9	55.0	
9.5	19 0.9	55.8		9.0	54.2	49.4	A	9.5	39.3	3.4		8.6	18.5	51.8		9.0	31 5.0	2.1	
8.5	9.0	33.3	A	9.2	43 3.1	18.8		9.5	48.7	23.0		8.4	38.4	52.1		9.5	32 24.1	29.5	
9.4	21.7	18.5		8.5	13.7	35.7	A	9.1	55.8	17.8		8.7	43.9	4.5		9.5	26.3	5.1	
8.3	27.5	29.1	A	9.5	22.9	12.8		9.0	58 7.2	18.2		9.0	52.0	21.4		9.0	33 13.5	27.0	
9.4	21 13.9	9.2		9.5	49.4	29.9		8.5	8.2	43.0		8.8	53.5	51.3		9.5	34.5	41.4	
9.3	41.4	26.9	R	9.5	44 21.3	54.5		9.5	27.3	35.4		8.7	58.9	29.3		9.4	48.8	23.5	
9.2	47.6	10.2		9.2	53.1	30.9		9.4	59 23.5	34.2		8.6	12 39.1	38.3		9.5	34 34.5	6.4	
9.5	22 4.0	19.6		9.4	55.4	4.7		9.5	30.0	6.7		9.0	13 16.2	47.8		9.0	35 1.7	4.3	
8.8	14.9	28.9	R	9.4	45 2.8	13.1		9.3	0 29.9	9.6		6.7	57.5	28.6	G	9.0	36 14.0	8.2	
9.5	36.0	0.3		9.5	5.9	13.7		9.3	43.1	52.4		9.2	14 5.9	39.0		8.6	36.5	8.9	
9.3	50.0	5.7		9.1	9.0	14.3	B	9.5	1 12.2	35.0		7.5	43.9	40.4	A	9.5	38 26.6	35.4	
8.8	23 18.4	13.5		9.4	22.8	43.9		9.3	28.9	41.9		9.2	50.2	47.3		9.4	29.6	21.2	
8.3	49.4	55.5	R	9.4	38.4	48.9		9.2	41.5	49.0		9.5	50.6	57.1		9.4	36.3	6.9	
8.5	59.0	4.9	A	9.0	54.3	0.0		9.5	2 3.6	32.5		8.7	52.7	50.6	A	9.0	47.3	24.7	B
9.0	24 29.0	38.3	B	9.3	46 13.7	37.2		9.0	19.6	30.1		9.4	15 40.4	34.0		9.5	39 3.5	25.2	
9.5	31.7	41.3		9.3	27.5	39.8		9.5	29.8	27.8		9.2	45.0	37.9		9.1	7.0	40.7	
8.4	48.4	14.5	A	9.5	48.6	44.6		9.5	32.5	31.7		9.5	16 3.8	4.5		7.0	8.0	40.0	S
8.4	25 6.0	53.9	B	9.5	57.9	53.7		8.5	52.9	22.4		6.0	6.1	20.0	A	9.4	44.8	4.9	
9.5	30.1	55.8		9.4	47 1.2	39.2		9.4	3 7.0	22.4		9.4	10.6	53.6		9.4	45.4	54.9	
9.1	32.3	56.2	B	9.5	8.2	4.7		9.5	9.1	2.3		8.7	17 10.6	40.5	A	9.5	40 7.3	53.0	
9.2	46.8	40.7	R	9.1	11.0	58.0		9.1	14.8	22.6		9.5	18 10.2	22.1		8.5	9.8	30.4	
9.0	26 34.2	58.8	A	9.5	13.5	26.4		9.1	30.9	10.8		9.5	10.2	13.7		9.5	25.0	56.9	
9.1	40.7	56.4	A	6.3	17.1	19.7	A	8.9	34.2	54.5		9.1	13.2	17.1		9.3	41 26.8	29.0	
8.0	27 5.9	35.4	A	9.5	50.4	21.2		9.5	50.8	6.7		9.1	15.0	24.2		9.3	33.0	41.4	
9.5	46.7	6.7		9.1	48 27.9	53.6		9.5	57.2	35.4		9.1	20.6	31.5	B	6.5	49.3	10.5	R
9.5	28 12.2	22.0		9.5	35.2	32.7		9.3	4 5.9	29.7		9.3	21.1	32.7		9.1	42 8.5	8.1	
9.5	32.4	50.7		9.2	52.5	54.7		9.5	25.0	7.8		9.5	54.4	51.6		9.5	26.1	57.3	
9.5	59.3	50.2		9.5	49 10.0	2.4		8.1	25.1	38.1	B	9.5	19 4.0	16.4		9.5	44 33.6	39.4	
9.5	29 5.9	44.8		9.5	19.6	20.3		8.8	40.4	25.6		9.3	10.2	55.5		9.5	44.0	35.4	
9.5	16.7	56.8		9.2	59.5	14.2	B	8.9	41.2	20.8		9.5	27.4	26.3		9.5	54.7	7.2	
8.8	26.2	12.8		9.5	50 15.3	10.7		9.0	44.5	11.1		9.5	51.4	50.3		9.0	45 3.6	26.5	
9.5	26.4	27.7		9.3	15.3	11.4		9.5	5 4.9	48.0		8.7	20 11.6	35.5		6.8	55.7	53.6	G
9.5	44.4	27.5	B	9.2	23.2	55.0		9.5	30.7	9.1		9.5	21.2	30.6		9.5	46 18.5	52.3	
8.4	30 2.3	13.4		9.5	59.0	55.0		9.5	41.2	5.4		9.5	30.0	7.0		9.3	45.0	34.1	B
9.5	45.1	39.3		7.3	51 2.8	11.3	G	9.5	57.6	6.9		9.3	53.9	37.9		9.5	47 33.0	35.9	
9.5	31 11.9	22.0		9.5	30.4	57.6		8.4	6 2.4	52.8	A	8.8	21 0.4	47.0		9.0	39.1	44.4	
9.5	18.0	23.0		9.5	57.6	58.1		9.2	11.1	38.5		7.6	35.7	15.6	B	9.4	48 5.0	59.2	A
9.5	46.4	57.5		9.4	52 4.4	5.3		8.2	28.6	55.9	A	9.5	22 23.0	27.4		8.7	49 0.2	29.3	
9.0	32 31.0	49.0		9.5	10.8	14.9		9.5	49.7	34.1		9.4	25.7	43.6		9.4	36.0	32.9	
8.2	40.8	52.6	R	9.5	28.3	37.2		9.4	7 12.9	34.5		9.5	29.9	9.0		9.4	53.1	50.3	A
9.5	50.1	13.0		9.1	41.6	32.8		8.5	44.8	1.2		9.5	58.4	20.4		9.0	59.1	16.2	R
9.5	33 36.9	45.8		8.8	44.0	15.1		9.5	57.7	35.4		9.5	23 4.1	32.4		9.1	50 14.1	8.8	B
8.9	35 7.5	55.9		6.5	53 13.5	2.5	G	9.5	8 0.0	40.3		9.4	26.6	3.6		6.7	18.2	13.2	A
8.5	8.9	32.3	A	9.1	23.0	22.4		9.0	10.5	59.0		9.2	57.5	41.9		9.3	21.9	7.2	
9.5	45.4	31.4		9.1	45.7	35.1		9.2	17.3	3.1		9.5	24 22.5	33.4		8.2	51 12.8	52.6	A
9.2	53.0	13.5		8.8	54 55.5	25.8		9.1	36.9	57.6	B	9.5	29.8	27.5		9.5	27.3	56.6	
9.2	55.6	21.5		9.5	59.6	19.8		9.5	38.9	56.9		9.3	54.3	52.7		9.2	32.0	27.9	A
8.5	36 18.8	2.9	A	9.5	55 2.3	31.0		9.3	46.5	19.1		9.0	25 4.0	44.4	A	9.4	42.5	35.9	

2801—2807				2808—2813				2814—2819				2820—2825				2826—2831			
	23h	+59°			23h	+59°			23h	+59°			23h	+59°			23h	+59°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	51 56.0	13.8	A	9.5	53 10.5	36.0	B	8.7	54 38.9	7.8	A	9.4	55 26.3	10.9	A	9.5	58 11.2	28.2	
9.2	52 14.3	7.6	A	9.4	41.3	34.9		9.0	48.6	8.9	A	9.4	51.1	10.0	A	9.5	42.7	29.8	
8.5	24.0	30.4	A	7.8	54.0	33.1	A	7.5	55.3	53.6	A	9.5	56 13.0	11.8	R	8.4	50.0	39.0	A
8.9	26.9	16.8	A	9.4	54.1	43.4		9.5	56.0	42.7	A	9.3	26.5	51.4	A	9.5	59 16.1	48.9	
9.3	49.7	0.4	B	8.6	54 0.0	32.4	A	9.0	55 13.5	1.2	B	8.7	49.1	21.5	A	9.4	39.4	11.0	
9.0	57.6	32.9	A	9.0	16.2	39.4	A	9.3	20.6	9.6	A	9.5	57 36.4	24.5		9.5	58.0	19.5	
9.5	53 3.2	36.9																	

Zone +60°

1—40				41—80				81—120				121—160				161—200			
	0h	+60°			0h	+60°			0h	+60°			0h	+60°			0h—1h	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	1 50.8	34.4		9.5	14 21.3	56.1		9.5	32 32.3	2.2		9.4	43 10.0	51.2		9.5	56 18.4	55.2	
9.5	2 40.9	21.6		9.3	27.2	51.1		9.2	49.8	48.7		9.1	44 2.7	56.6	A	8.3	53.2	0.2	A
9.5	3 4.4	43.4		9.5	15 18.3	39.4		9.1	33 32.2	38.9		9.0	18.3	29.4	R	9.5	56.9	38.4	
9.2	4 1.3	57.4		9.4	55.1	1.8		9.5	34 45.9	59.0		5.0	28.2	19.1	A	9.3	58 25.0	26.1	
9.5	23.9	42.4		7.5	16 1.5	7.5	A	9.5	46.3	42.0		9.2	28.8	17.7	B	9.5	32.0	32.5	
9.5	5 6.5	59.4		9.3	4.0	2.7		9.4	52.4	57.7		8.8	29.3	50.6	A	9.2	56.9	35.4	
9.4	18.4	34.4		8.8	6.7	41.1	A	9.4	35 0.9	58.1		9.3	45 29.5	36.1		9.5	59 10.2	33.5	
9.4	53.3	22.6		9.3	17 35.9	0.5	A	9.5	2.8	59.9		9.1	48.6	26.5	R	9.5	40.4	59.0	
9.5	6 32.8	36.9		8.9	18 13.8	14.1	A	9.5	14.6	56.2		9.0	46 4.5	43.6	B	9.3	57.5	41.9	
9.5	48.4	47.3		8.8	19.2	44.8	A	9.5	20.6	52.0		8.5	18.3	52.8	A	7.8	0 26.8	46.2	B
9.4	7 0.8	20.6		9.3	33.4	37.4	R	9.5	24.0	57.0		9.1	20.0	51.1		9.1	29.4	36.3	
9.0	11.5	38.4		9.0	18 0.3	21.9	A	8.5	27.3	28.9	A	9.4	29.8	36.4		9.5	48.2	14.3	
9.0	23.9	58.4		9.4	3.7	13.6		9.0	33.2	13.3	B	9.0	35.9	28.9	R	9.5	53.7	39.7	
9.5	25.2	32.5		9.4	7.2	24.1		9.0	36 4.1	59.0		9.5	47 27.6	59.1		9.4	1 20.9	23.6	
9.5	8 8.6	4.1		9.4	21.0	28.8		9.1	10.9	57.5		7.9	30.8	28.4	A	9.3	51.6	18.9	
6.9	11.9	12.2	A	9.1	33.3	35.4	R	9.5	57.8	34.4		8.5	48 20.3	46.8		9.3	53.3	37.5	
9.4	32.6	13.7		9.5	21 0.8	7.2		8.8	37 5.4	12.5	B	7.0	34.6	38.4	L	9.1	2 40.5	23.4	
9.5	48.0	31.5		9.5	5.7	12.1		9.3	16.5	11.5		9.5	49 21.5	46.6	B	9.5	51.9	57.4	
9.3	53.2	5.7		9.4	25.2	3.2		8.5	39.7	22.0	A	9.0	50 37.4	55.5		9.0	57.2	25.0	
9.5	9 7.0	19.6		9.0	48.1	22.7	B	9.1	38 4.2	43.8	A	9.2	51 10.9	21.9		9.4	3 5.5	32.9	
6.0	12.6	43.4	A	9.3	22 39.1	23.4	A	9.5	35.5	36.9		9.3	38.2	1.4	R	9.4	6.1	58.3	
9.2	42.3	51.5		9.5	42.2	53.4		9.5	38.5	34.9		9.2	52 31.2	0.8		9.5	17.2	38.3	
9.5	57.9	51.8		8.9	52.8	37.9	A	9.5	40.9	40.1		8.8	33.9	15.7	A	9.5	22.5	32.4	
9.5	10 20.0	7.0		9.3	23 34.0	20.5	A	9.5	49.5	38.9		9.5	53 1.4	25.0		9.5	52.9	2.2	
7.9	30.3	55.4	A	9.4	24 10.9	3.0	B	8.4	39 1.0	41.8	A	9.5	36.3	54.0		9.4	55.7	38.4	
8.9	38.8	5.8	B	9.5	25 14.5	36.5		8.8	15.3	32.4	A	8.5	42.9	48.4		6.6	58.7	56.1	A
9.3	42.2	36.1		9.4	17.0	36.0		8.1	51.5	47.5	A	9.4	46.2	0.6		9.5	4 10.5	9.4	
9.5	44.9	19.7		9.5	20.0	30.8		8.6	52.7	10.2	A	9.4	46.4	38.4		7.2	55.4	6.9	A
9.0	51.6	37.4	B	9.4	45.9	39.0		9.0	40 7.3	19.2		9.4	53.2	5.2		9.2	59.0	6.0	B
9.5	11 2.4	56.7		9.2	27 2.0	57.5	J	9.4	13.0	49.8		9.4	58.3	59.8		9.2	5 5.8	11.3	
9.2	25.8	4.2	B	8.5	36.4	40.3	A	9.2	13.7	14.8		9.2	54 1.8	19.1		9.4	19.1	33.9	
9.5	12 29.5	25.0		9.5	28 31.3	19.1		9.2	41.5	23.0	A	9.1	2.0	12.2	A	9.2	21.3	6.9	A
9.5	48.9	15.6		9.4	53.0	34.4		9.5	41 10.3	26.0		8.3	9.0	59.7	A	7.5	35.1	10.4	A
9.5	13 29.8	46.6		9.4	58.8	0.0		9.5	42.6	7.1		9.2	17.0	21.4	B	8.6	6 0.7	5.6	A
9.5	34.3	38.4		9.3	30 23.2	56.5		9.2	42 23.9	31.6	B	9.5	25.9	0.1		9.5	28.0	24.9	
9.4	39.5	18.6		9.2	58.3	58.0	B	9.3	43.8	30.7		9.1	39.3	25.6		9.5	54.2	15.9	
7.7	46.1	53.1	A	9.2	31 10.9	3.9	A	9.0	52.9	19.6	A	6.5	44.5	18.1	A	9.5	7 39.7	35.5	
8.8	52.9	16.6		8.2	18.8	53.5	A	9.4	43 6.3	39.9		6.0	55 25.9	48.8	A	8.6	48.8	53.4	R
9.1	14 0.2	55.5		9.1	48.1	3.1	A	9.5	8.4	4.2		9.5	55.7	24.5		9.4	8 6.9	30.8	
9.2	6.5	43.3	A	9.5	32 7.2	9.2		9.2	9.7	11.6	A	9.0	56.8	56.5	A	9.1	27.4	58.4	

201—260				261—320				321—380				381—440				441—500			
	1ᵘ				1ᵘ				1ᵘ				1ᵘ				1ᵘ—2ᵘ		
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.0	8 49.0	57.5	A	8.7	22 57.4	22.8	B	8.6	34 29.8	33.8	A	9.5	46 1.1	7.0		9.1	59 33.0	50.9	
9.4	9 31.1	26.6		9.5	23 8.1	13.3		9.4	35 9.1	4.6		9.5	10.0	14.5		8.7	52.9	7.4	
9.0	35.9	48.3	A	9.5	11.4	5.1		9.5	11.3	19.7		7.3	15.7	34.0	A	8.3	0 15.3	16.1	
9.4	45.1	6.5		9.3	29.0	57.7		9.5	16.8	33.0		9.5	40.4	2.9		8.0	51.0	39.8	A
8.6	58.5	55.7	A	8.7	54.9	48.6	A	9.5	24.9	23.1		9.5	40.5	6.9		8.0	1 0.1	31.4	A
8.8	10 21.7	48.8	A	9.5	24 20.9	15.0		9.4	32.1	2.1		8.0	47.9	31.5	A	9.5	16.1	47.8	
9.0	11 7.6	29.1	A	9.5	33.7	25.8		8.5	47.3	18.2		9.3	54.9	31.9		8.6	20.2	1.2	
9.4	18.2	39.8		9.5	25 13.5	21.6		9.5	55.1	11.0		9.5	47 11.2	7.8		9.0	39.0	50.5	
7.3	35.7	11.3	A	8.7	23.1	2.4	A	9.3	58.8	35.1	B	8.8	12.0	25.1	A	9.4	2 24.6	20.5	
9.5	38.2	3.5		9.1	24.5	1.0	A	9.5	36 1.4	32.9		9.2	17.2	33.1	A	9.5	31.9	0.8	
8.7	38.7	22.4	A	9.1	27.5	2.4	A	9.0	1.5	30.4		9.5	26.4	47.1		9.4	3 5.6	24.1	
9.5	45.8	2.5		9.3	28.8	59.2	B	9.5	5.7	28.6		7.8	46.9	28.6	A	9.4	8.7	18.3	
8.3	12 20.8	30.1	A	8.5	55.3	43.8	A	9.0	11.1	29.9		9.5	47.0	51.5		9.5	4 20.0	49.2	
8.3	31.9	45.1	A	9.5	58.0	31.7		9.5	12.2	28.2		9.5	48.0	41.1		9.3	5 11.5	55.5	
9.5	35.7	12.3	R	9.5	59.0	32.1		9.4	12.6	15.7		8.8	51.6	58.9	A	9.3	16.4	38.0	
9.5	13 6.5	16.1		9.5	26 0.0	32.4		9.0	14.4	42.7	S	8.9	53.2	5.8		8.1	48.0	2.8	
9.2	6.7	40.2	A	9.5	32.2	5.1		9.5	18.8	52.2		9.4	48 5.7	0.5		7.5	6 47.1	40.3	S
9.5	20.6	53.3		9.0	32.8	5.8		9.5	26.8	5.5		6.6	19.1	59.3	B	9.4	7 51.0	4.3	
9.0	34.4	25.0	B	8.5	45.8	14.1	A	8.8	29.2	31.6	A	9.1	19.3	14.2		9.0	8 5.4	14.8	
9.2	40.4	0.7		8.9	46.7	1.1	A	9.5	31.1	26.0		7.5	24.8	50.0	A	9.5	18.1	16.8	
8.5	52.2	57.7	R	8.5	55.8	31.7		9.5	32.2	24.0		9.1	35.7	41.1		8.9	18.6	28.1	
9.3	14 1.8	8.5		9.5	57.0	41.4		9.5	38.9	28.4		9.5	36.4	1.4		8.8	18.6	58.4	
9.4	4.1	54.7		9.5	27 2.1	3.5		9.1	38.9	31.7	S	8.2	52.8	50.0	A	9.2	9 0.6	50.3	B
9.5	16.2	38.0		9.5	14.3	5.2		9.5	39.1	25.5		9.0	49 6.1	25.6		9.5	16.5	49.1	
9.1	27.1	3.7	A	9.5	17.7	40.8		9.4	48.0	46.2		9.5	14.9	23.1		8.9	11 24.9	20.7	B
8.8	27.4	8.3	A	9.5	36.2	17.2		9.5	52.4	51.4		9.4	26.6	14.0		9.5	26.3	0.5	
9.3	34.1	40.2		9.0	28 21.8	18.3	A	9.3	37 14.5	28.3		9.4	30.7	13.5		9.1	55.7	2.1	
9.2	44.2	10.3		9.5	31.8	32.0		9.3	15.7	41.3		9.5	50 5.5	31.3		9.5	12 9.9	22.2	
9.2	15 16.0	22.9	A	9.5	34.5	36.7		9.5	16.1	49.2		9.5	19.5	40.3		9.4	27.1	29.5	
9.1	27.8	13.2		9.5	44.3	59.4		9.5	18.9	20.7		9.4	23.5	12.4		9.4	31.6	9.5	
9.3	27.8	8.5		9.4	54.2	45.6		9.0	25.2	23.9	A	9.0	33.8	5.8		8.3	45.0	14.5	
9.4	41.2	2.5		7.7	54.7	5.0	A	9.3	38 39.0	9.8		8.7	41.4	18.2		6.6	14 52.1	52.4	A
9.4	44.5	23.1		9.5	29 2.8	57.6		9.5	39 7.6	31.9		9.5	54.9	13.2		9.3	58.4	23.1	
8.8	48.1	57.0	A	9.5	10.5	36.1		9.5	20.1	51.3		9.4	56.2	18.2		9.5	15 47.2	20.5	
9.5	16 19.8	24.7		8.5	22.4	26.8	A	9.5	34.3	47.8		9.5	51 24.6	13.1		9.0	16 4.3	21.5	
9.5	17 5.7	49.1		7.2	22.6	19.9	A	9.5	34.6	1.2		9.3	30.3	20.9	B	9.1	6.0	15.2	
9.4	13.0	39.5		8.8	23.2	53.3	B	8.6	38.0	17.2	A	9.4	39.8	9.3		9.4	16.2	40.0	
9.1	30.9	40.2		9.5	44.1	31.6		9.0	39.5	19.0	A	9.5	52 16.3	36.5		9.5	40.6	3.2	
9.5	57.1	37.0		8.6	30 8.2	9.7	A	9.4	40 44.0	53.3		9.5	25.7	37.7		9.5	54.1	49.2	
9.0	18 32.2	34.0		9.5	41.7	3.2		9.5	48.2	31.3		9.3	47.1	21.4		9.5	54.6	20.5	
9.5	46.1	7.9		9.2	44.4	53.5		9.5	50.7	21.6		9.5	50.7	11.5		9.0	17 16.7	49.2	
9.5	19 15.5	54.5		9.3	56.2	28.3		9.1	54.6	37.4		9.5	53.2	52.8		9.5	18 3.0	51.1	
9.5	25.4	48.6		9.5	31 37.0	41.2		9.5	41 1.0	55.2		7.7	58.1	0.3	A	9.0	7.2	52.0	B
9.5	56.1	5.7		9.5	48.2	14.3		9.2	7.3	48.2		9.5	53 39.9	15.8		9.3	20.8	17.0	
9.5	20 1.9	2.5		9.0	54.1	21.1	A	9.5	18.5	21.4		9.2	54 37.7	7.3		8.8	46.2	29.2	A
9.2	5.3	13.2		9.5	54.5	30.6		8.6	34.1	12.3	A	9.5	55 0.5	50.0		9.4	46.9	0.2	
9.3	17.8	40.1		9.5	55.0	35.2		9.5	36.0	37.8		9.4	0.5	52.5		8.1	51.9	0.3	B
9.5	47.1	35.2		6.5	32 15.4	17.9	A	9.5	42 24.5	6.6		8.9	29.6	58.5	B	8.5	56.2	1.0	
9.5	59.1	0.9		9.5	19.1	58.2		9.2	58.0	7.8		9.5	45.4	12.2		9.0	57.0	17.9	A
9.5	21 2.5	37.4		9.4	25.1	40.7		9.5	43 9.6	33.5		8.5	56 11.5	20.8	A	8.7	19 1.0	18.4	A
9.5	31.3	11.5		9.5	58.7	6.4		9.4	10.4	25.2		9.3	13.8	14.2		9.1	2.0	6.2	
9.5	41.6	1.9		6.3	33 8.0	41.2	A	8.3	33.3	16.0	L	9.0	19.4	6.3		9.2	2.0	2.9	
7.3	57.3	47.9	A	9.1	13.5	12.3		9.4	33.5	30.9		9.4	36.7	13.1		8.4	59.6	31.5	A
8.0	22 3.5	8.8	A	9.3	21.9	12.0		9.5	58.6	4.9		9.5	39.5	48.0		9.5	20 6.1	22.0	
7.7	7.9	17.7	A	9.5	24.7	2.8		9.5	44 0.0	23.4		9.1	57 40.8	42.1		8.0	14.2	3.6	A
7.7	14.7	37.4	A	9.5	28.5	9.3		9.1	58.9	57.9		9.5	58 15.2	39.4		9.5	59.5	53.8	
7.9	17.5	46.3	A	9.3	37.5	48.6	B	9.5	45 7.0	41.2		8.7	25.4	15.5	A	8.6	21 0.2	58.4	
9.5	22.4	47.8		8.5	34 13.3	35.2	A	9.5	14.1	35.2		9.5	59 7.8	3.9		9.5	14.6	5[illegible]	
9.5	50.5	23.8		9.5	17.2	16.1		9.5	48.7	31.3		8.9	18.3	38.2		9.5	18.9	3[illegible]	
9.5	51.6	43.0		9.5	22.7	25.7		8.8	54.8	57.7	A	9.4	26.3	45.6		9.5	29.0	[illegible]	

561—620					621—680					681—740					741—800				
	2ᵃ		+60°			2ᵃ—3ᵃ		+60°			3ᵃ		+60°			3ᵃ—4ᵃ		+60°	
m	′	″	′		m	′	″	′		m	′	″	′		m	′	″	′	
8.0	34	0.8	46.1	A	9.5	53	21.8	21.1		9.4	14	36.2	31.7	R	9.4	35	35.2	16.8	
9.5		9.0	35.4		9.4		46.0	49.2		9.4		59.3	19.0		9.5		46.6	13.5	
9.5		16.4	39.8		9.5	54	12.9	23.8		9.5	15	55.1	28.3		9.0	36	19.4	23.9	
9.2	35	27.3	50.8		9.3		54.1	6.6		9.2	17	7.7	21.9		9.4		25.6	46.8	B
9.5		30.1	34.6		8.8	56	28.7	45.4	A	9.1		16.8	3.3		9.3		28.3	26.2	
9.5	36	11.6	32.0		9.5		34.0	48.8		9.5		36.9	54.3		8.8	37	22.6	32.7	A
9.5		22.9	7.9		9.3		40.1	5.1	B	9.4	18	7.2	4.2		9.5		31.1	51.4	
9.0		44.8	53.3		9.5		51.2	50.4		9.5		46.3	53.8		9.1		43.8	48.6	
9.5	37	3.6	38.5		9.5	57	31.5	56.1		9.4		57.0	58.7		8.8		47.6	2.9	
9.4		10.7	9.5		9.5	58	38.2	50.5		9.5	19	8.8	1.9		9.4	38	6.2	25.9	
9.5		30.9	46.1		9.4		48.7	43.6		9.5		48.0	3.2		9.0		20.1	52.3	
9.5		51.0	6.9		9.4		48.2	31.5		9.5	20	16.6	1.0		8.8		37.5	48.6	A
9.5	38	28.4	37.1		8.2	59	26.6	23.9	A	9.5		25.3	28.2		8.7		51.9	4.4	
9.5		35.0	31.8		8.6		28.7	34.5	A	9.0		43.7	45.3		8.4	39	14.3	54.9	A
9.0		53.9	58.5		9.3		58.9	50.9		9.0		51.8	13.4		8.7		21.9	8.5	
9.3	39	32.0	56.6		7.0	0	0.0	4.4	A	9.5	21	7.3	50.6		9.5		40.0	50.2	
9.5		51.7	56.6		9.5		14.4	57.7		9.0		20.0	25.5	R	9.4		59.8	12.9	
9.4		56.2	4.2		9.2		32.6	47.0		9.5		57.1	34.7		9.4	40	18.1	3.2	
9.2		58.1	10.0		9.4		34.1	23.0		9.5	22	1.9	13.3		9.5		20.6	49.2	
9.5	40	1.8	59.4		8.8	1	11.5	15.2		9.4		7.8	13.8	B	9.5		44.8	28.3	
8.2		23.9	32.5	B	9.5		24.5	8.6		9.2		7.9	0.4		9.1	41	2.0	38.8	
9.5	41	43.2	38.9		9.4		36.7	19.4		9.5		22.8	41.3		7.8	42	36.4	44.3	B
8.3		53.4	29.5		9.5	2	18.5	58.0		9.5	23	12.4	30.0		9.5	43	4.8	22.9	
9.2		58.4	1.2		8.6		26.8	19.3		9.5		18.5	5.7		9.4		10.0	26.3	
9.0	42	1.1	15.4		9.5		42.3	58.0		8.7		43.1	40.6		9.1		37.5	18.3	
8.3		57.4	3.0		9.3		54.5	54.8		9.4	24	5.1	38.6		9.5	44	1.0	17.0	
8.8	43	12.2	49.4		9.5	3	3.8	39.7		9.5		12.0	31.7		9.5		10.4	17.8	
9.2		14.7	8.1		9.5		36.9	16.4		9.3		16.1	5.2		5.8		49.3	40.0	A
9.0	44	2.1	16.8		9.5		37.5	10.4		9.4		16.7	7.0		9.3	46	28.7	48.0	
9.5		7.8	36.7		9.2		55.6	5.4	B	9.2		30.8	28.6		9.0	48	22.1	52.4	
5.9		30.0	55.5	B	6.0		56.2	34.8	A	9.1		48.5	32.8		9.5		26.2	39.8	
9.1	45	3.5	37.4		8.7		59.9	8.2	A	9.3	25	44.0	10.4		9.0	49	1.7	2.6	
9.4		36.2	24.1		9.0	4	4.2	7.6	A	9.2		44.2	13.3	B	8.5		39.8	20.3	A
9.1		40.2	49.5		9.5		40.3	40.1		9.5	26	11.8	28.3		8.5		57.6	16.4	A
9.1		44.7	58.1		9.4	5	12.5	45.1	B	9.5		17.3	35.4		9.0	50	37.5	18.8	A
9.3		51.2	4.3		9.4		20.4	16.5		9.5		22.5	33.8		9.5	51	15.4	43.8	
7.8	46	15.7	32.1	L	9.3		23.0	24.6		9.5		25.1	4.2		9.5	52	14.5	40.8	
9.4		33.3	0.6		9.4		23.0	30.8		9.5		32.8	23.0		9.5		27.3	16.8	
9.5	47	12.4	33.0	B	9.5		27.5	29.3		9.4	27	7.2	40.6		8.5	53	51.7	39.4	
9.0		26.7	22.1		9.5		53.2	44.8		8.3		17.6	50.9	A	7.8	55	59.4	29.1	A
9.2		28.5	47.6	A	9.5		58.6	35.5		9.1		27.1	19.4		9.5	56	0.5	38.5	
9.5		32.0	48.1		9.0	6	0.9	34.4	B	9.5		36.0	28.1		9.5	57	25.4	14.9	
9.4		32.4	10.8		9.5		50.2	37.6		9.5		55.9	23.8		9.5		31.6	9.9	B
9.1		38.5	50.8	A	9.5	7	24.5	39.0	B	9.5	28	3.8	50.5		9.2	59	40.7	50.3	
8.8		58.0	18.4	A	9.4		26.9	16.2		9.3		30.0	7.0		9.1	2	3.5	15.4	
9.1	48	0.0	0.7	A	9.0	8	48.2	14.6		9.4		34.5	8.4		9.5		44.8	40.0	
9.5		7.2	20.4		8.6		48.9	45.0	R	8.3		59.8	34.6	A	9.1	3	43.4	45.9	
7.2		21.0	42.2	A	8.5	10	24.1	55.9	A	8.6	29	4.8	10.8	B	9.2		56.7	35.0	
9.5		59.9	49.1		8.4		45.8	59.3	B	8.8		24.4	23.3	A	9.0	4	26.4	39.0	
8.9	49	6.5	48.2	A	9.2	11	12.9	7.8	B	9.3	30	58.9	6.2		9.0	5	25.6	2.1	
9.5		33.9	9.6		8.0		28.9	46.1	A	9.3	31	5.2	11.1		8.6	6	1.7	28.2	
9.5	50	27.0	17.2		8.9		43.7	52.4		9.3		48.8	15.3		7.0		6.2	7.1	A
9.5		32.2	34.6		9.0		48.6	13.1	B	9.4		50.5	4.4		8.4		32.0	36.9	B
9.3		34.5	36.9		9.5		52.4	55.5		9.5	32	45.4	40.7		8.1		34.5	53.7	
9.2		51.4	18.6		9.5	12	9.2	59.6		7.3		46.0	59.8	A	8.8	7	19.4	39.0	
9.0		52.0	57.2		9.4		50.5	9.2		9.5	34	13.1	49.8		9.0		47.9	25.7	
9.4	51	41.7	53.5		9.4	13	11.9	1.0		9.5		39.2	42.3	B	9.4	8	32.5	41.0	
9.1		44.0	23.2		8.4		54.2	55.9	A	9.5		41.0	38.2		8.8		35.6	46.9	
8.8		57.9	15.8		9.5	14	2.5	36.7		9.5		46.3	9.3		8.7		59.6	25.8	C
9.4	52	24.7	20.5		9.4		35.7	57.4		8.6	35	5.5	24.0		5.7	9	13.9	23.7	C

801—860				861—920				921—980				981—1040				1041—1100			
	4u	+60°			4u—5u	+60°			5u—6u	+60°			6u—7u	+60°			7u	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	9 45.3	23.7		9.5	58 16.5	45.3		8.0	50 45.6	26.3	A	9.5	23 34.6	43.0		9.5	5 44.4	33.8	
9.5	10 19.4	25.7		9.5	59 5.9	59.0		9.0	51 16.5	16.5		9.5	24 18.6	39.0		9.5	6 13.9	56.0	
9.0	41.3	29.1		9.4	0 1.9	7.1	A	9.0	52 7.1	41.5		9.2	20.5	2.2		9.2	24.4	46.1	
9.1	11 30.9	44.8		9.0	2 39.9	41.8		8.2	17.0	27.6	A	9.5	53.1	15.4		9.2	7 1.0	0.9	
8.7	42.3	51.8	A	9.5	3 24.1	58.7		8.2	21.9	40.3	B	8.4	25 5.0	11.8		9.4	9 6.4	48.1	
9.2	12 35.0	9.6		9.4	29.3	5.5	A	9.5	41.7	57.5		9.0	12.2	20.3		8.0	6.5	35.4	B
9.5	37.6	18.8		8.7	45.4	6.0	A	9.5	53 59.2	58.3		9.5	27 12.6	32.5		8.9	8.9	14.7	A
9.3	14 25.6	29.4		9.0	47.9	28.6	A	9.1	54 2.3	28.1		9.5	36.2	22.6		6.5	33.9	9.4	A
9.4	28.3	42.6	B	9.5	4 18.3	59.7		9.5	56 48.8	30.6		9.4	28 29.3	39.4		9.3	10 12.7	33.4	A
9.5	15 12.6	10.0		8.2	33.4	0.2	A	9.4	51.0	0.6	B	8.8	29 34.2	22.2		9.5	21.6	46.6	
9.5	16 14.7	59.6		9.5	5 53.5	52.7		6.9	58 9.0	28.5	G	9.5	53.9	24.6		9.5	11 40.9	30.3	
9.5	18 17.4	58.4		9.4	54.4	11.4		9.5	18.0	31.0		9.5	31 32.4	38.5		9.5	12 10.7	11.7	
9.5	19 17.2	59.7		9.0	59.2	5.6		9.5	0 54.6	39.4		9.5	33 9.0	47.8		8.8	13 18.5	40.6	A
9.5	29.1	56.8		9.5	6 48.4	32.5		9.5	1 43.7	30.0		9.5	29.2	28.2		8.7	45.2	50.7	
9.2	42.8	2.1		9.4	7 12.7	8.8		9.5	2 12.6	10.5		9.5	41.0	1.6		8.8	49.6	53.3	A
9.5	21 16.6	23.6		9.2	16.3	6.6	B	9.5	13.0	27.5		9.3	34 20.0	37.7		8.9	15 58.0	12.2	
9.2	20.9	48.2	A	9.4	29.4	16.5		9.5	27.6	43.8		9.1	25.2	2.3	B	9.5	16 20.4	27.5	
9.4	29.3	25.4	B	9.0	9 27.4	11.7	B	5.8	41.2	1.7	A	9.0	35 58.9	20.4		9.5	17 31.0	4.2	B
9.3	22 25.9	58.2		9.5	10 42.8	33.5		9.5	43.5	52.3		9.1	36 7.9	5.2	A	8.8	18 46.0	48.1	
9.4	34.0	58.0		9.5	12 28.0	51.7		9.5	3 40.0	31.5		8.6	27.0	20.4	A	8.4	49.5	46.1	
9.3	37.8	51.7		9.4	13 16.9	36.0		8.7	4 40.5	32.3	A	8.3	37.8	19.0	A	7.8	21 18.9	19.5	F
9.4	23 31.8	54.1		9.5	14 41.4	18.4		9.5	55.5	11.8		8.5	39.8	38.1	A	8.1	49.9	7.9	A
9.3	36.9	30.6		9.5	15 45.8	58.1		9.5	5 1.6	51.0		8.6	52.6	28.7	A	8.8	22 46.2	57.3	A
9.0	24 43.3	50.8	A	7.0	16 53.4	8.5	L	9.1	7 15.9	56.7	B	9.2	38 15.4	27.3		9.5	23 18.2	17.0	B
7.8	25 9.9	22.1	A	9.5	17 32.0	58.0		9.1	32.3	48.3		8.5	39 21.8	33.2	A	9.4	34.1	16.5	B
7.0	31.1	35.0	A	9.4	18 17.4	31.0		9.4	42.0	5.0		9.4	53.7	14.5		9.2	24 31.1	54.3	A
7.7	45.2	55.4	A	9.5	54.8	27.6		9.1	43.4	6.6		9.5	41 5.2	9.2		9.5	41.0	27.0	
9.5	27 28.9	59.0		9.5	21 26.4	29.5		9.4	8 16.0	36.5	R	9.3	22.5	1.8		9.5	45.2	46.1	
9.5	28 3.5	58.6		9.3	22 1.5	24.5		9.5	34.4	24.7		9.3	42 24.9	39.4		6.7	49.2	50.4	A
9.5	31 2.5	49.9		8.0	24 2.2	29.5	A	9.5	38.7	37.5		9.3	42.2	56.3	B	9.2	25 32.5	23.5	A
9.3	23.7	32.7	B	9.5	35.4	48.7		7.0	53.0	49.7	A	9.3	43 19.6	49.8	B	9.4	27 13.0	5.1	B
9.0	27.9	13.9		9.3	26 51.5	30.5		9.5	9 45.2	1.0		9.5	44 50.9	31.3		9.3	29 19.6	54.7	
9.3	29.7	32.7	A	9.2	27 28.9	49.6		9.0	10 7.0	29.1	A	9.5	57.0	31.3		9.4	30 39.0	37.3	
9.1	33 14.4	38.4	A	7.0	28 32.2	31.9	L	9.0	16.0	49.7	A	9.1	45 0.0	24.3		9.4	31 21.0	23.4	
9.5	24.5	47.6		9.3	29 45.4	49.1		7.0	11 9.0	9.0	A	7.5	6.3	58.5	B	9.4	32 18.5	45.1	
9.0	34 26.4	1.7	A	9.3	47.0	54.1		9.3	10.0	52.8	A	9.5	7.9	25.6		9.3	39.5	11.1	B
9.4	42.9	42.5	B	7.8	30 21.0	56.3	A	9.3	11.7	47.1		8.7	14.1	46.4		9.5	58.1	9.8	
9.0	37 3.9	12.5	A	9.5	31 15.4	17.8		9.0	14.0	48.2	A	9.4	31.2	27.5		9.1	33 0.5	58.0	A
9.5	13.1	58.1		9.5	32 23.8	40.3		9.4	14.9	57.2		9.5	46 11.0	43.6		8.7	24.4	49.7	A
9.5	58.1	29.0		9.5	26.5	10.4		9.5	12 30.2	40.8		9.4	51.9	27.1		9.4	34 15.0	12.1	
9.3	40 47.9	27.2		9.2	34 12.4	42.2		8.1	53.9	51.7	A	9.3	47 3.6	48.1		9.5	52.4	45.1	
9.4	54.9	49.5		8.8	36 48.7	30.5	A	9.0	13 10.8	8.6		9.5	48 6.4	16.6		7.0	35 25.2	38.6	A
8.7	41 25.8	19.3	A	9.2	38 1.0	51.1	A	7.9	46.6	42.4	B	8.6	25.0	36.3		9.1	37 24.5	10.1	A
9.2	56.9	38.9		9.5	26.4	5.0		9.0	14 46.0	28.1		8.5	50 19.4	49.1	A	6.7	36.4	40.5	A
8.5	42 7.5	49.5		8.7	55.6	54.0	A	9.5	15 1.4	17.4		9.0	53 1.9	32.8	A	8.7	38 58.2	17.4	A
9.4	42.9	0.7	A	9.0	39 13.1	48.2	A	9.5	19.2	49.8		7.0	13.2	0.5	A	9.5	39 17.3	0.7	
9.0	43 42.4	37.5		8.9	29.2	41.3	A	9.5	25.3	42.1		8.5	28.8	20.3	A	9.5	20.6	53.6	
9.3	44 20.4	30.5	B	9.5	40 46.3	7.8		9.5	44.6	50.8		9.5	55 5.0	57.0		8.9	40 15.3	7.5	A
9.5	47 14.1	54.3		9.4	50.0	16.2		9.2	16 20.0	37.1		8.8	53.9	29.9	A	9.5	31.8	49.9	
9.2	39.4	43.3		9.4	56.9	8.5		8.0	17 2.6	52.3	A	9.4	56 44.8	27.4	A	9.0	42 16.3	10.3	A
9.5	48 17.9	32.0		9.1	41 2.7	27.9		7.2	21.5	13.8	A	8.6	45.0	57.8	F	9.3	20.1	35.5	A
9.0	20.3	58.4		8.6	4.0	0.1	B	9.0	18 0.6	20.7		8.2	57 17.0	18.2	A	9.5	33.9	30.0	
7.0	36.7	50.8	L	9.4	42 39.7	30.0		9.1	12.0	7.6	A	9.5	41.6	15.7		9.2	45.2	6.7	B
9.5	49 45.4	29.0		9.5	44.4	30.3		8.5	19 16.8	49.7		7.5	58 37.8	27.2	A	9.0	43 2.8	8.9	A
8.7	50 28.4	11.4	L	7.1	45 40.8	21.4	B	8.5	59.0	5.4	A	8.8	0 42.5	21.0		9.1	22.1	56.2	B
9.0	34.9	12.9	S	8.9	56.7	45.8		9.2	20 10.6	24.1		9.5	1 51.6	49.5		9.4	26.5	56.9	
9.2	53 26.7	57.7	A	8.8	46 10.8	2.9		8.5	21 47.6	34.0	A	9.0	2 42.5	37.8		8.0	44 1.5	2.6	
9.2	54 25.3	59.7		9.5	39.5	36.5		8.0	55.3	47.3	A	7.3	47.0	0.4	G	9.3	45 3.2	32.0	
9.2	57 25.5	8.0		9.5	48.6	8.0		8.4	22 36.0	1.2	A	7.8	4 19.9	9.7	F	8.9	8.2	1.1	
9.5	34.2	6.0		9.5	47 32.8	15.4		9.0	23 32.6	45.2	B	9.5	33.7	55.8	B	8.5	24.7	27.0	

1101—1160				1161—1220				1221—1280				1281—1340				1341—1400			
	7ʰ—8ʰ	+60°			8ʰ—9ʰ	+60°			9ʰ—10ʰ	+60°			10ʰ—11ʰ	+60°			11ʰ—12ʰ	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	47 31.2	22.3		8.5	47 17.8	42.3	L	8.0	45 59.7	7.6	A	9.5	32 20.4	41.2		9.1	35 21.1	40.9	
9.4	56.7	57.0	B	9.5	50 18.9	23.2		8.6	47 36.2	57.6	R	9.0	32.6	47.1	A	9.5	28.3	34.0	
9.5	48 18.8	53.2		9.5	23.3	42.5		9.1	48 30.0	46.8	A	9.5	38.0	30.9		9.3	36 14.6	3.5	
9.2	49 9.6	49.3	B	9.5	26.3	16.9		9.5	37.0	11.0		9.5	35 18.4	35.8		9.3	22.6	24.7	
6.1	19.2	42.3	G	9.1	34.5	5.1		9.5	49 7.7	51.5		9.5	36 18.9	29.0		9.4	25.0	5.2	
8.3	50 3.8	48.7	F	9.0	51 42.4	34.0	A	9.0	28.2	20.1		9.5	58.4	20.5		9.1	25.5	37.5	A
9.1	52 11.3	32.0	A	9.5	45.3	42.8		9.0	50 32.0	21.1	R	8.3	37 22.0	0.1	A	7.7	55.7	50.7	A
9.5	54 8.0	54.7		9.2	53 37.3	20.3	A	8.6	51 57.3	51.5	R	8.5	38 6.3	24.0	A	9.4	56.8	0.1	
9.2	16.0	26.3	A	8.9	44.0	50.8	A	9.5	58.6	10.3		7.2	15.1	51.9	A	8.9	37 18.0	5.8	A
9.2	56 10.3	16.4	A	9.0	57 52.2	54.2	R	9.5	52 21.0	56.5		9.4	33.4	25.0		9.5	38 32.6	53.8	
9.1	40.4	43.9	A	9.2	58 26.3	30.1	A	9.5	53 11.2	10.3		9.4	47.3	30.9		9.4	34.9	26.2	
8.6	50.9	16.4	A	8.5	41.3	46.4	A	9.3	22.1	5.4	A	9.5	40 38.4	33.8		7.7	45.1	0.2	A
8.7	58 3.4	21.3	A	9.4	41.7	47.4	B	8.3	34.5	34.3	R	9.3	44.7	51.3	A	9.3	48.5	46.0	
8.0	59 24.2	44.9	A	9.5	59 52.3	39.5		8.0	54 24.3	22.1	R	8.5	41 5.4	39.8	A	8.5	52.7	38.9	A
9.3	51.4	20.3	A	9.4	0 43.4	49.8	A	9.5	46.1	20.6		8.0	42 0.1	55.5	A	8.6	39 20.1	48.2	A
9.2	0 55.4	0.7	R	9.5	2 17.8	39.0		9.0	55 9.0	39.1	A	5.8	15.6	4.9	A	9.2	43 36.3	50.8	B
8.3	3 10.7	27.2		8.8	52.4	48.3	R	8.5	49.0	57.5	A	8.3	48 28.1	53.2	A	9.2	44 41.0	21.2	
9.2	23.0	14.4		9.1	5 36.9	58.8	A	8.2	57 12.0	28.4	A	9.5	41.2	48.9	B	9.5	45 1.6	9.5	
6.8	35.4	49.8	G	9.4	6 36.4	22.1		9.1	58 13.0	40.6	B	7.7	49 21.8	2.5	A	9.2	43.1	10.0	
9.5	4 44.6	44.8		8.3	52.4	39.0	A	8.7	36.2	52.8	A	9.4	50 2.0	54.8	A	8.0	46 19.5	29.1	A
8.7	5 10.9	59.3	A	7.3	9 21.1	22.8	G	9.5	59 50.7	36.3		8.7	52 39.1	53.9		8.5	43.3	9.4	A
9.3	22.2	16.4		9.4	39.4	1.7		9.5	0 30.1	37.9		9.0	53 7.8	19.1	A	8.0	48 12.6	29.0	A
8.9	40.0	53.1	A	9.0	11 39.6	27.7	A	9.5	2 33.6	42.2		9.3	51.9	21.4		9.5	49 0.4	59.8	
6.0	46.9	0.1	A	9.5	47.2	10.0		8.9	4 12.5	36.4		8.6	54 0.4	55.5	R	9.5	34.5	22.8	
9.3	59.7	6.1		9.5	12 31.3	29.1		7.7	24.6	6.4	R	8.8	12.1	12.0	A	9.4	51 21.9	49.8	
8.4	6 41.7	56.2	A	9.5	13 41.5	19.3		6.3	5 7.5	43.7	A	8.0	55 27.7	38.5	A	9.5	24.7	44.4	
9.2	43.4	1.1	A	8.0	52.2	37.0	A	9.3	15.8	16.1	B	9.0	45.2	35.5	A	8.1	52 20.2	58.0	B
9.4	7 50.3	31.5		9.5	14 42.4	12.0		8.2	53.5	3.9	A	9.0	56 21.1	19.8	A	7.5	53 11.5	9.6	A
9.4	10 19.8	30.1		9.5	15 28.3	10.0		9.5	54.2	38.8		8.8	57 7.2	36.1	A	9.2	39.4	56.9	A
9.0	13 4.6	2.6	A	9.2	16 31.3	59.5	R	6.7	6 2.8	51.9	A	9.5	58 36.2	7.1		8.4	55 17.1	19.7	A
9.0	35.6	54.4	A	9.5	17 44.9	29.2		8.5	43.5	5.9	A	9.4	51.3	20.8		9.5	57 26.1	0.7	
8.3	57.8	9.5	A	8.4	18 38.2	28.2	A	9.5	9 42.2	19.6		9.3	0 37.6	58.6	A	9.2	58 36.6	22.7	A
9.2	16 19.2	34.0	A	9.0	19 59.1	32.1	A	9.2	10 56.1	58.4	A	9.5	1 42.2	49.8		9.3	45.1	45.8	
9.5	17 27.0	15.4		8.8	22 40.2	26.2	A	9.0	11 55.0	2.4	A	8.9	4 59.0	32.6	A	8.5	59 38.6	34.5	A
9.5	18 36.1	40.0		8.9	23 27.6	57.9	A	8.6	12 4.5	17.2	A	9.5	5 8.9	56.3	B	8.9	0 9.1	31.1	A
7.8	19 10.1	23.5	B	9.5	25 6.4	8.1		9.3	14.4	16.2	A	8.6	7 3.2	34.1	S	9.1	18.0	51.0	
9.2	14.4	10.5	A	9.3	26 46.0	40.5	A	8.8	34.9	16.7	A	9.0	27.7	49.3		9.5	2 39.7	59.7	
9.2	22 4.9	9.0	A	6.5	48.6	51.0	A	9.4	14 28.8	14.7	A	6.7	45.7	42.9	R	9.0	3 7.0	54.9	A
9.0	31.6	48.5	A	9.4	28 36.0	41.5		9.0	15 34.8	0.0	A	9.1	9 31.0	58.8		9.5	56.4	40.8	B
9.5	54.3	57.0		9.4	30 47.6	19.3		9.5	58.3	48.1		9.5	10 13.8	40.5		9.5	58.6	12.5	
9.3	23 5.4	36.6	A	9.0	31 57.0	56.2	A	7.5	16 26.6	0.6	A	9.3	23.3	29.1	A	8.7	4 0.1	6.3	A
9.4	24 51.3	23.3	B	9.3	32 17.5	53.6		9.5	17 56.0	57.5		9.3	11 52.3	37.0		8.4	45.7	29.5	A
9.5	56.5	24.7		9.5	42.4	32.7		6.5	18 3.6	19.4	A	9.5	14 40.9	13.0		7.7	5 50.1	31.7	B
9.0	25 11.4	32.5		9.4	33 31.3	14.9		9.0	19 1.9	44.2	A	9.1	44.7	36.5		9.1	57.6	37.5	A
9.4	26 7.0	10.5		9.4	33.5	3.6		8.3	54.3	48.1	A	9.5	16 6.2	15.4		9.5	6 2.4	18.9	
8.3	31.8	57.4	A	9.0	35 2.2	19.8	A	8.5	21 15.9	30.3	A	7.5	22.6	27.2	A	9.5	13.4	26.0	B
9.2	51.4	7.6	A	9.4	30.4	2.2		9.5	50.4	29.0		9.3	30.0	56.7		9.5	8 39.0	29.6	
6.8	27 20.4	25.7	A	9.3	37 3.7	11.5	B	9.5	24 53.4	58.5		9.5	18 19.3	11.5		9.5	9 32.7	13.8	
7.5	28 36.9	5.1	A	7.4	38 14.3	46.0	B	9.2	26 12.3	41.6		9.5	19 1.7	43.0		8.7	10 24.1	3.2	A
9.5	29 15.0	35.1		8.5	39 2.6	39.5	A	8.9	27 51.9	31.9	A	6.8	23 6.2	29.6	A	9.5	12 9.5	50.3	
9.2	15.4	24.7	A	8.7	40 4.9	52.0	A	9.5	28 1.0	52.7	B	9.4	48.1	54.4		9.0	14.5	28.2	A
8.9	30 10.4	24.7	A	9.5	29.4	2.2		9.5	11.5	49.9		9.4	24 21.8	39.1	B	9.5	14 47.1	44.8	
9.3	34 34.0	35.5		9.5	41 39.0	9.0		9.5	44.9	21.6		8.8	39.6	51.9	A	8.9	53.6	35.5	
9.5	36 39.9	2.1		9.5	42 5.2	59.2		6.7	51.1	51.6	A	9.4	26 55.2	4.6	B	8.5	15 5.5	23.3	R
9.1	41 45.9	24.7	A	9.5	46.8	10.5		9.5	29 15.4	10.3		9.3	29 6.6	6.5		9.5	22.4	10.0	
9.0	43 44.5	0.7	A	7.0	43 48.1	35.6	F	9.5	30 14.8	59.8		9.5	36.0	36.0		7.2	53.2	55.9	R
7.7	44 30.6	53.4	A	9.1	58.0	27.2		9.0	37.5	41.7	A	9.3	30 21.7	13.4	A	7.3	16 55.0	54.6	A
8.5	45 18.2	57.1	A	9.5	44 5.7	4.6		9.3	56.8	32.4		9.4	32 9.1	21.3		8.3	17 33.0	18.4	A
8.3	41.6	46.3	A	9.4	45 6.9	16.9		8.0	31 34.3	5.9	A	7.5	49.5	54.5	B	8.4	18 28.4	20.9	A
9.4	46 7.3	48.1		9.5	49.4	57.9		9.1	32 1.0	51.0	A	9.5	33 23.5	21.8		9.4	22 20.8	58.9	

1401—1460				1461—1520				1521—1580				1581—1640				1641—1700			
	12h—13h	+60°			13h—14h	+60°			14h	+60°			14h—15h	+60°			15h—16h	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.4	22 40.3	13.1		5.3	23 8.4	42.7	A	9.5	8 32.0	4.2		9.0	57 54.8	9.1		9.4	53 14.1	58.0	A
9.4	23 7.5	16.6	B	9.0	14.2	22.1		9.4	9 18.1	44.4		6.0	58 3.6	46.5	B	9.5	54 58.9	14.1	
9.4	39.0	0.0		9.1	25.0	55.8	B	9.5	18.5	16.6		9.5	17.2	37.1		8.4	55 59.4	10.7	
9.5	26 15.2	0.0		8.5	29.6	40.0	A	8.5	30.3	33.6	A	6.5	0 4.0	36.6	A	9.4	57 7.7	5.8	B
8.9	27 29.6	32.5	A	8.3	56.1	45.4	A	9.5	11 17.3	15.5		8.2	13.0	6.2	B	7.5	59 17.4	1.8	G
var	29 46.6	17.2	B	9.2	56.2	39.3	A	9.3	19.5	46.3		7.2	50.5	6.0	B	8.5	30.9	54.0	S
9.5	30 40.7	0.5	B	8.9	24 33.7	48.6	A	9.2	22.7	54.9	A	9.0	56.6	27.3		9.5	43.7	28.2	
8.5	43.9	1.1	A	9.0	25 52.7	16.2	A	9.5	52.7	52.0		9.5	1 38.8	51.7		9.3	0 11.4	26.6	B
9.1	31 46.1	48.2		9.3	26 27.8	53.5		9.5	12 3.6	47.0		7.8	2 55.0	22.3	F	8.0	30.6	51.1	S
9.5	50.2	25.3		8.4	44.7	35.9	A	9.3	42.8	18.4		9.0	4 28.6	28.2		9.5	1 20.9	8.3	
9.2	54.7	29.6	B	8.4	27 1.6	22.6	A	8.3	14 11.3	45.9	A	9.5	5 30.7	28.7		9.5	38.5	1.4	
9.5	32 15.0	18.6	B	9.3	29 41.9	41.8		9.1	29.8	14.4	A	9.0	31.0	44.4	A	9.1	2 4.8	26.1	B
8.3	42.6	32.9	A	9.0	30 11.5	58.4		9.5	44.4	4.2		9.0	6 8.0	28.7	A	7.0	19.4	26.2	B
9.5	33 25.5	52.6		8.9	13.7	39.4	B	7.3	18 25.8	26.3	F	8.3	9 28.5	40.5	A	9.0	31.9	37.7	
8.9	49.6	28.5	A	9.3	31 18.3	37.0		9.5	19 50.3	24.2		9.4	38.8	50.3		9.5	3 16.9	57.7	
8.2	52.5	19.6	A	8.2	37.8	26.1	A	9.2	20 24.5	54.6		9.1	10 27.5	28.7		9.3	5 1.6	50.5	A
9.0	37 7.6	49.6	A	9.5	34 35.5	46.4		9.1	21 53.4	0.1	B	9.0	33.6	5.7		9.3	55.5	59.4	A
9.5	39.5	42.3		9.3	35 6.8	6.2		9.4	55.3	5.7		9.1	13 12.7	17.9		6.8	7 28.4	15.1	G
9.5	40 5.0	50.1		9.3	28.1	4.2		9.4	22 56.4	23.9		7.8	32.4	39.0	A	7.8	8 18.9	3.3	G
9.5	57.6	39.3		8.8	37.6	27.8	B	9.4	56.6	4.1		9.2	42.5	20.9		8.5	31.9	18.2	
8.0	42 57.5	9.2	A	8.8	38.1	26.9	B	7.3	23 30.3	22.4	A	8.5	57.2	45.9	A	9.3	10 47.9	27.5	B
8.7	44 42.8	46.9	A	9.1	36 27.3	41.4		8.3	24 21.5	41.3	B	9.5	14 15.7	0.3		8.6	12 59.4	36.2	A
8.6	46 23.1	40.7	A	9.5	38.0	59.0		9.4	46.3	3.1		8.1	15 34.5	2.8	B	9.4	13 26.4	27.9	A
9.0	39.9	32.4	A	7.5	38 42.8	33.1	A	8.0	25 6.4	32.0	B	8.7	16 27.0	46.0	A	7.8	14 34.6	53.1	
7.9	59.9	43.4	A	6.5	54.4	52.6	A	9.2	12.9	53.9	R	7.4	54.3	51.5	A	5.5	50.4	4.9	A
8.0	47 24.9	18.3	A	7.0	39 8.8	4.7	A	9.2	27 33.4	22.8		7.4	17 3.5	53.7	A	8.5	16 12.9	2.4	A
9.2	56.5	7.9	A	9.2	40 2.3	25.2	A	6.2	45.6	51.3	A	8.9	4.4	52.8	B	8.8	53.9	40.2	A
9.3	48 18.0	10.4		9.5	41 3.4	8.5		8.2	54.7	35.2	B	9.3	18 8.0	12.0	A	9.1	17 40.6	9.5	B
8.5	49 19.6	24.6	A	8.7	32.3	39.9	A	9.5	28 53.8	38.7		9.4	57.8	53.3	A	7.0	57.2	7.0	A
9.3	50 7.1	33.4		9.3	55.0	58.9		7.7	30 32.9	29.6	B	9.5	19 32.2	10.6		9.1	19 37.4	3.6	B
9.5	44.5	30.0		9.5	55.3	4.2		9.3	56.3	17.5	A	8.9	20 49.5	26.8		9.0	53.1	35.3	B
9.5	54.4	13.8		8.8	42 2.9	53.5	B	9.1	31 2.6	19.5	B	8.0	22 14.5	30.2	A	9.0	20 3.5	27.9	
9.5	51 45.4	53.1		neb	44 24.4	54.3		9.3	33 46.8	30.2		9.2	27 18.8	3.2	A	8.3	4.6	23.2	F
9.2	53 41.6	11.7	B	8.6	46 30.2	16.0	A	8.4	34 58.3	39.8	B	9.3	55.5	29.7		9.5	18.0	36.7	
8.5	49.1	12.3	A	8.9	49 6.3	36.6		9.3	36 46.8	30.1		7.7	28 46.4	12.5	F	9.5	21 43.7	40.7	B
9.4	54 9.6	7.4		8.5	51 52.3	28.7		9.2	59.3	41.9		9.3	29 46.0	15.0		8.0	22 47.9	38.2	
9.5	55 3.7	11.0		8.5	52 4.9	12.1	B	7.8	38 47.7	50.9	B	9.5	46.8	52.6		9.5	23 59.1	3.9	
7.6	56 23.1	1.5	A	9.3	8.0	26.7		9.2	39 27.0	51.8		9.5	31 7.9	8.4		9.5	24 2.9	33.3	
6.5	42.5	31.4	A	9.2	28.2	21.2	B	9.5	55.5	18.7		8.4	16.6	48.4	A	9.5	25 15.2	13.6	A
9.5	58 0.2	17.2	B	9.3	34.8	40.0		7.3	40 50.9	40.0	B	9.5	18.7	11.2		9.3	22.4	18.0	A
9.4	59 36.0	37.7	B	9.1	54 51.6	12.5	B	9.4	41 41.0	12.9		8.0	32 10.1	44.4	A	9.1	55.4	6.3	A
8.9	0 31.8	1.5	A	9.5	55 16.5	35.1		9.5	44.4	24.0		7.8	19.5	9.6	A	8.0	27 1.6	57.3	J
9.4	33.1	38.8		9.2	23.2	53.3		8.5	56.1	35.8	B	7.9	21.5	34.6	A	9.3	28 9.6	30.0	A
9.1	34.3	12.3		9.0	56 18.8	10.0		9.1	42 13.3	35.8	B	9.3	33.2	5.1		9.4	47.4	29.3	A
8.0	58.0	55.9	A	8.3	37.6	15.9	F	9.4	35.0	22.1		9.4	34 16.2	50.6	A	7.5	29 52.9	47.5	A
9.2	1 30.6	43.1	A	9.3	58 21.8	39.5		9.3	54.3	57.0		9.4	45.7	57.4		8.9	30 41.0	6.4	
9.4	32.0	30.4		9.1	0 4.3	3.6	A	6.8	43 15.5	19.1	A	8.7	35 55.3	28.0		8.9	32 7.2	9.8	
9.4	3 52.8	16.6	B	9.3	42.0	30.2		8.4	44 52.0	15.2	A	9.5	37 12.0	8.5		7.0	56.8	45.8	B
9.5	4 53.5	48.7		8.9	54.4	24.5	B	9.5	47 11.2	38.7		8.2	38 32.9	27.3	S	9.4	58.5	31.8	
9.4	56.2	17.2		9.5	2 7.5	57.1	B	9.5	12.9	57.1		9.3	39 43.1	36.1		9.4	35 45.4	20.1	
9.5	6 5.4	11.3		9.0	14.9	27.8	B	9.5	24.0	49.1		9.2	40 41.0	10.5		8.2	37 3.9	59.7	A
9.2	5.5	48.1	A	8.7	18.4	27.1	B	7.4	50 28.8	6.3	B	8.8	42 13.9	30.2	A	8.9	6.8	46.6	
9.0	7 31.6	42.8	A	9.2	19.6	8.5		9.3	44.0	40.5		9.2	43 13.0	45.0	B	9.5	38 15.0	60.[illegible]	
8.0	8 45.6	23.6	A	8.7	44.4	21.7	A	9.5	51 0.0	52.0		8.9	23.7	45.3	A	9.5	39 30.0	[illegible]	
9.5	55.0	3.4		9.4	4 11.9	52.9		9.4	53 55.5	3.1		6.0	44 43.9	1.7	A	9.5	40 42.4	[illegible]	
8.0	9 12.3	3.7	B	6.0	16.8	0.8	A	9.4	54 44.0	26.5		9.5	45 14.3	34.1		9.5	58.4	[illegible]	
9.5	14 12.6	8.4		9.5	6 10.7	29.1		9.5	46.5	10.0		7.4	46 41.8	58.0	B	8.0	42 13.[illegible]	[illegible]	
7.7	35.1	37.3	B	9.1	7 17.8	16.5		9.5	55 18.7	59.8		8.5	47 18.9	38.5	R	9.3	44 18.[illegible]	[illegible]	
8.6	16 34.7	33.4	A	9.0	48.3	41.9	A	9.5	56 23.0	30.7		8.8	50 20.4	33.1		8.5	3	[illegible]	
8.8	19 18.7	26.6	A	9.3	8 23.3	52.2		9.5	57 38.3	24.3		9.3	51 6.5	15.4	A	9.4	[illegible]	[illegible]	

1501—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	16h—17h	+60°			17h—18h	+60°			18h—19h	+60°			19h	+60°			19h	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.3	44 46.4	16.6		9.1	29 42.3	2.4	A	9.2	17 25.2	44.7		9.0	1 30.7	8.5		9.4	21 57.4	37.5	
9.2	45 21.4	7.3		9.4	30 52.0	52.3	A	9.2	34.0	46.8		9.5	2 43.7	34.2		9.5	58.3	2.8	
9.0	32.7	29.4		9.4	31 1.5	58.2		9.2	51.6	43.4		9.5	3 10.9	49.6		7.5	22 1.9	3.7	A
9.0	33.7	10.7	B	8.0	32 19.8	10.7	A	8.8	18 09.2	50.9		8.6	34.7	14.4	A	6.8	11.1	54.9	A
9.5	47.9	42.6		9.5	33 31.7	33.3		9.4	20 13.8	53.0		9.5	55.7	14.9		9.4	17.3	2.8	
8.9	47 14.1	22.8	R	9.3	50.9	5.3		9.5	49.4	55.6		8.8	4 1.9	20.4		9.5	24.2	45.9	
9.3	43.8	37.1		9.2	34 27.3	22.4		8.2	24 6.0	23.4	B	9.3	58.6	52.5		9.5	23 9.2	21.8	
8.8	48 21.3	19.5		8.9	35 24.8	42.5		9.3	50.8	32.7		9.0	5 37.4	3.7		9.2	22.4	25.4	
9.4	49 10.0	33.7		8.9	36 20.3	6.2		9.0	25 1.6	14.0	A	9.1	46.9	37.7		8.9	23.5	41.0	
8.3	59.8	44.5	A	9.5	38 31.5	30.8		9.3	44.5	1.2		9.5	6 23.5	20.2		9.1	24 2.2	9.9	
9.5	50 16.4	43.0		9.4	37.0	12.8		9.5	26 4.7	47.4		8.9	24.0	50.0	R	9.5	33.8	34.9	
9.5	51 46.4	10.6	A	9.5	37.4	8.8	B	8.0	42.1	20.3	L	8.7	25.7	33.3	B	9.4	39.3	23.7	
6.5	52 4.7	36.2	A	9.3	40.6	50.3		9.5	27 47.6	41.0		7.7	29.1	32.7	B	9.5	43.8	6.2	
9.2	19.6	47.6	A	8.9	43.7	2.5	B	9.5	30 48.8	16.4		9.5	7 5.4	9.7		9.4	25 45.2	41.7	
9.0	25.8	5.3	A	8.5	39 47.8	25.4	L	9.2	31 56.6	12.5	A	9.0	24.3	14.6		9.5	26 11.7	37.7	
9.5	35.9	18.3	B	9.5	41 5.9	31.8		9.5	33 31.2	24.3		9.1	31.0	30.0		9.5	30.9	12.7	
9.5	37.0	19.4	B	9.5	20.4	50.5		9.0	42.6	32.7	A	9.4	44.3	49.6	B	9.5	32.5	27.5	
9.5	53 12.2	7.7		9.2	55.8	20.2	B	9.4	42.6	8.1		8.4	8 11.3	4.1	A	9.1	58.3	22.4	
9.5	54 36.9	50.9		9.3	42 22.6	36.1		9.0	34 18.6	54.3	A	9.5	11.9	8.8		7.0	27 21.8	22.0	R
9.3	36.9	36.9		8.5	44.8	38.1	A	6.8	36 38.6	33.7	G	9.4	9 6.6	3.5		9.3	38.0	17.0	
8.8	55 17.0	1.0	A	7.8	58.5	20.9	A	9.2	40.5	53.2	A	9.1	27.2	17.4		9.5	53.2	46.4	
9.0	42.9	40.8	A	9.3	43 8.3	50.5		9.3	37 31.7	20.9		8.2	44.6	50.6	A	9.4	28 10.2	45.1	
9.1	56 35.9	1.3	A	9.5	44 34.7	33.8		9.4	39 38.6	11.0		9.4	44.7	29.6		7.3	29 38.7	32.9	A
9.5	57 40.4	37.0		9.4	49 6.6	59.9		9.4	42 4.6	30.7		9.4	10 4.8	6.2		9.5	47.8	9.7	
9.5	58 0.8	47.8		9.0	27.0	25.4		6.0	38.1	53.8	A	9.2	41.5	47.5		9.4	30 2.5	53.6	
9.5	42.5	37.9		9.1	59.3	6.3		8.3	38.1	12.0		8.5	53.5	24.2		9.5	14.6	6.6	
9.2	59 20.8	19.3		6.5	50 42.3	25.8	L	9.8	43 31.2	35.2	A	9.4	11 9.3	54.4		9.5	28.2	58.1	
6.5	27.6	51.1	A	9.4	57.4	31.9	B	8.8	44 0.0	21.8		8.8	11.0	53.1	B	9.5	36.3	53.5	
9.0	30.2	28.5		9.5	51 13.0	1.6		8.3	23.1	40.9	A	9.0	19.6	41.9		9.4	31 13.8	52.5	
9.3	0 39.2	48.9	B	8.8	52 9.6	18.5		8.6	45 5.1	34.6	A	9.0	20.9	7.6		9.5	31.6	47.7	
9.5	1 1.8	34.0		9.5	53 27.3	22.0		9.2	46 54.6	19.8	A	8.7	27.7	17.5		9.5	32 11.5	45.5	
9.3	2 8.4	19.2		9.3	55.8	12.5	B	6.8	48 31.1	39.9	A	9.5	47.4	35.6		9.5	23.1	59.7	
7.6	3 34.3	46.6	B	8.5	59.2	42.5		9.0	49 11.6	13.5		9.5	12 43.0	24.9		9.5	24.0	26.1	
9.5	55.3	28.5		9.0	54 2.0	2.4		9.0	38.1	43.6	A	9.5	44.0	25.5		9.5	33 24.7	26.5	
7.5	4 34.5	49.9		9.3	56.4	36.7		8.7	44.5	15.6		9.5	53.7	44.6		9.0	57.0	57.2	
9.5	48.0	6.2	A	9.4	56 24.1	36.7		9.4	53 0.0	54.7		9.5	13 16.4	27.5		9.5	34 22.8	29.1	
9.4	5 28.8	13.4	A	9.4	34.8	8.7	B	7.7	41.2	44.9	G	9.2	14 34.2	30.6		9.5	28.8	27.9	
9.5	7 58.2	4.5		7.5	58 15.1	27.5	A	9.2	54 40.4	6.5		8.7	46.9	47.3		8.5	31.9	32.2	A
9.5	8 23.9	50.0		9.4	28.6	46.4		9.3	42.0	0.2	B	8.4	51.7	19.5		8.5	33.2	51.8	
9.2	10 8.9	38.9	A	8.9	44.6	37.2	A	9.8	42.3	35.8		8.9	15 1.4	12.2		8.4	46.5	57.7	R
9.3	11 28.5	37.3		9.2	0 50.0	27.1	A	9.5	55 13.3	40.7		9.0	26.4	35.1		7.8	48.6	23.0	A
6.7	14 21.4	52.3	A	8.5	1 0.4	36.6	A	9.1	56 8.9	8.2		8.7	41.3	7.5		8.8	59.9	33.9	A
6.3	47.2	49.4	A	8.5	39.7	37.0	A	9.5	22.2	0.6		9.5	54.9	32.5		9.5	35 11.9	6.2	
9.5	15 1.3	44.5		8.2	46.7	8.2	A	6.6	41.6	28.0	A	8.6	56.0	9.0		9.5	28.7	9.5	
9.5	16 3.8	19.5		9.2	2 38.8	5.3	A	9.2	57 41.2	52.9		9.5	16 9.9	32.5		9.5	33.8	51.9	
9.5	17 9.0	54.8		9.1	48.7	41.2	A	9.0	58 10.4	17.9		7.0	13.6	41.3	A	9.5	36 1.1	35.9	
9.2	20 45.9	51.0		9.1	4 37.7	46.5	A	9.4	17.6	31.9		9.5	47.7	43.2		9.4	16.1	11.0	
9.5	55.5	17.0		8.5	50.6	44.0	A	7.8	22.8	46.6	A	9.5	17 2.9	23.3		9.5	21.4	19.0	
9.5	22 4.6	21.5		8.7	7 6.5	27.2		8.9	24.0	18.7		9.5	18.2	0.8		9.5	41.4	56.0	
9.3	15.8	31.8	B	9.5	29.7	31.8		9.4	28.0	22.2		9.0	43.4	34.5		8.8	37 34.8	29.4	R
9.0	17.7	52.2		9.3	53.0	21.5	B	9.5	34.3	43.6		9.5	52.0	51.8		6.5	58.0	10.2	A
9.1	19.5	38.7		9.0	8 20.3	6.2		9.4	59 15.6	53.3	B	8.4	18 17.9	36.0	A	9.1	58.0	10.5	
9.3	23 3.3	36.3		6.2	9 24.5	22.0	A	8.8	20.2	40.7	A	9.5	55.2	55.0		9.0	59.5	44.7	
5.5	50.2	10.2	J	8.0	49.2	35.4	L	9.4	26.3	59.3		9.4	19 0.0	50.4		9.1	38 2.3	16.1	B
9.0	24 6.5	34.7	A	9.2	10 0.5	6.9	A	9.2	36.5	1.6		8.9	20 21.5	13.9		9.4	9.8	27.3	
9.1	15.4	42.0	A	9.5	13 11.8	21.9		9.4	48.5	15.3		9.5	34.6	16.0		9.5	51.4	18.6	
9.4	28.8	24.9	A	9.2	30.7	9.0	A	9.5	1 5.2	17.4		9.5	50.4	47.1		9.1	56.6	3.0	
9.5	25 16.9	18.5		9.5	15 4.3	5.3		8.2	13.2	39.7	A	9.4	21 22.1	32.6		7.7	39 57.2	12.9	A
9.2	27 20.5	3.6	A	9.5	19.8	5.3		9.0	15.2	28.3		7.8	43.3	48.7	A	9.2	40 0.2	0.9	R
9.5	29 14.7	10.7		9.5	16 30.2	46.5		8.8	24.5	51.5	R	9.5	56.4	25.7		9.0	2.1	47.1	

2001—2060				2061—2120				2121—2180				2181—2240				2241—2300			
	19ᵘ	+60°			19ᵘ—20ᵘ	+60°			20ᵘ	+60°			20ᵘ—21ᵘ	+60°			21ᵘ	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.2	40 5.3	1.1		8.6	55 34.3	39.9		9.5	19 16.4	15.3		7.8	54 26.7	46.8	A	9.5	22 46.6	42.9	
9.4	7.1	47.4		9.5	36.4	41.6		9.5	52.1	10.0		9.5	52.3	1.0		8.8	23 14.1	32.1	
8.1	8.4	33.5	A	9.2	45.0	22.1		9.5	56.3	6.4		9.5	55 57.0	5.0		9.3	15.0	16.4	
9.5	41 37.5	36.7		9.5	56 0.4	46.8		9.5	20 47.0	11.8		8.5	56 11.5	33.0	A	9.5	24 15.6	11.5	
8.1	42 1.9	20.0	A	8.5	57 26.3	32.5		7.8	22 21.9	49.6	R	9.0	18.4	43.0	B	9.5	18.8	15.5	
8.3	54.3	4.0	A	8.3	33.0	15.2		9.5	23 40.3	4.9		9.3	24.3	6.4	A	9.5	20.0	12.2	
9.5	56.4	0.9		9.3	40.0	46.2		9.1	25 14.4	24.0		9.0	43.7	10.8		8.0	29.1	22.2	A
9.5	43 14.3	31.7		9.0	43.9	21.7		8.1	26 22.4	51.1	B	9.5	58.3	17.3		9.4	41.0	14.0	
9.3	21.2	28.6		9.3	54.8	49.7	B	9.2	32.5	29.0		9.1	57 2.0	14.3	A	9.5	49.2	16.3	
8.9	31.9	5.7	A	7.5	58 1.4	41.4	F	7.8	48.6	31.0	R	7.5	4.8	55.6	F	8.9	53.8	58.4	A
8.4	58.9	8.3	A	9.5	8.3	48.3		9.5	27 51.5	11.3		9.5	56.9	2.6		9.3	54.9	52.5	
9.5	44 2.6	13.5		8.2	8.8	6.6	B	8.5	59.0	36.5	R	9.5	58 4.6	26.7		6.9	25 16.0	47.9	A
8.5	31.4	5.7	A	8.1	59 33.0	59.1	F	9.5	28 33.6	16.2	B	8.8	43.6	20.3	A	9.5	26 26.5	41.0	
9.5	35.3	55.4		9.5	1 3.8	41.7		9.4	29 18.5	33.0		8.9	59 38.0	32.1		8.7	48.1	12.3	
9.5	45 22.4	34.2		8.0	8.3	37.9	R	8.5	38.7	42.8		9.5	0 45.1	47.9		9.1	27 24.6	58.6	
9.5	22.4	35.9		9.5	11.8	18.6		8.5	30 13.3	38.5	A	9.1	1 31.6	43.0		9.2	27.8	16.3	
9.3	25.0	47.0		9.5	49.3	58.3		9.4	28.0	1.5		9.1	33.6	35.6		9.3	32.7	18.9	
9.5	34.2	35.2		9.0	2 16.4	34.0		9.0	45.0	45.8	A	9.3	48.8	14.9		9.5	28 9.5	49.8	
8.9	41.1	51.5		9.0	19.4	29.7		7.0	34 17.5	51.2	A	9.2	2 59.8	13.8	B	9.5	14.9	46.3	
9.5	44.0	39.6		9.5	24.2	52.8		9.5	25.0	58.2		8.9	3 6.1	0.8		9.3	52.2	11.0	
9.3	48.5	36.9		9.4	28.3	52.1	B	9.1	29.3	43.7	A	9.2	10.3	18.5		9.5	29 12.5	58.3	
9.0	46 14.5	36.6		9.1	3 45.4	42.5		7.0	47.1	15.2	A	9.0	55.7	8.1		8.2	19.9	25.1	A
9.5	47 24.7	3.0		9.5	4 10.4	19.0		8.4	53.0	36.0	B	9.3	4 45.6	28.7		9.4	22.7	16.4	
9.5	30.0	38.7		9.0	14.9	16.1	R	9.2	35 9.5	0.5		9.5	53.4	5.8		9.3	30 5.9	31.1	
9.1	56.3	2.8	B	9.1	31.3	42.4		8.3	31.9	24.1	A	8.0	5 42.6	18.4	A	9.5	16.4	24.2	
6.1	48 7.7	50.4	A	9.3	38.7	18.0		9.0	37.0	30.0		9.5	6 35.8	58.7		9.5	16.8	8.0	
8.5	10.6	31.9	A	9.5	5 11.8	4.3		9.5	36 0.1	5.1		9.3	51.1	19.3		9.5	31 14.5	16.2	
8.6	13.5	1.6		9.0	25.8	43.0		9.3	9.4	4.1	B	9.5	7 31.0	28.1		9.4	20.6	2.5	
9.3	55.4	44.1		9.0	37.8	42.5		9.5	18.4	41.9		9.4	44.6	18.8		9.2	40.8	52.3	
9.5	49 0.9	33.4		9.5	6 3.9	25.0		9.4	38 4.0	45.2		9.5	9 14.0	6.8		9.5	32 32.9	13.5	
9.2	4.4	45.0		9.5	22.0	36.4		9.5	9.6	25.5		9.5	53.3	0.1		7.5	33 17.8	25.9	A
7.9	37.5	56.3	A	9.5	24.0	56.6		8.5	39 15.0	55.8		9.4	12 15.6	49.8		9.5	50.9	39.6	
8.3	38.4	18.7	A	9.0	49.4	37.2		9.5	23.7	46.2		9.0	13 46.9	15.9	B	9.2	56.8	57.0	
9.0	55.9	39.9	A	7.8	7 47.6	55.6	F	6.2	36.5	4.1	A	9.5	14 1.5	57.9		8.5	34 16.2	58.3	A
9.5	50 10.6	2.7		9.4	8 30.3	13.8		9.5	40 56.5	8.5		9.5	36.3	58.3		9.0	32.0	10.9	B
9.5	19.2	2.5		9.5	59.5	14.3		9.0	41 9.9	29.0		9.0	44.1	39.4	A	8.3	35 3.2	54.0	A
9.5	49.4	24.0		9.4	9 27.3	49.8		9.2	30.5	6.8		7.0	57.6	34.1	A	9.4	54.7	8.1	
9.5	51 6.5	29.0		9.4	51.8	0.9		9.5	42.0	38.3		8.6	15 23.9	14.9	A	8.3	36 13.9	51.1	A
9.5	14.4	20.9		6.0	10 47.8	12.7	G	9.5	58.3	30.8	B	8.8	26.4	53.5		9.4	23.1	6.8	B
9.5	16.4	49.2		9.0	11 9.8	34.4	R	9.1	42 45.1	5.2	A	9.5	16 6.4	17.4		9.5	36.5	19.9	
9.5	20.0	33.7		9.1	24.3	19.9		9.5	43 8.0	1.4		9.1	27.9	33.3		9.5	37 17.0	33.6	
9.4	32.9	24.8		9.0	39.2	26.1	B	9.1	31.6	30.0	A	9.1	31.0	30.7	A	9.5	33.8	21.1	R
9.4	49.3	20.7		9.0	12 32.8	23.5		9.5	44 18.8	0.2		8.0	32.0	1.2	A	9.4	47.5	2.2	
9.5	52 12.2	1.7		9.2	41.3	42.5		9.1	20.9	51.6	A	6.5	41.2	4.3	A	9.5	55.7	31.6	
6.8	21.8	26.3	A	9.5	14 4.0	45.0	B	9.5	49.0	48.7		8.5	42.4	22.2	A	7.9	40 6.8	13.0	F
6.6	25.2	13.6	A	8.5	10.3	29.5	F	9.5	45 10.6	52.2		8.2	43.1	30.6	A	9.5	32.9	58.7	
9.2	53 0.4	28.4		9.5	53.7	55.7		9.5	21.3	12.2		6.8	52.0	9.1	A	9.2	44.2	55.3	R
9.4	9.4	25.5		9.4	16 0.8	19.1		9.5	49.0	17.3		8.8	17 19.5	51.3	A	4.5	41 17.3	26.2	G
9.2	12.4	52.0	A	8.0	12.2	9.6	F	8.0	50.7	35.5	A	8.3	35.0	5.5	A	9.3	27.4	33.5	
8.8	13.3	9.0		9.4	26.5	35.9	B	8.7	46 25.3	8.7	A	9.5	51.6	39.4		8.0	56.8	25.9	R
8.7	20.7	20.9		9.5	37.9	35.4		9.5	47 35.2	50.8		8.8	19 15.9	27.3		8.8	43 0.8	18.3	
9.4	29.0	37.4		8.5	40.8	49.8		8.7	48 52.5	55.2		9.5	28 6	43.0		9.2	7.7	58.6	A
9.5	30.2	0.5		9.5	18 11.7	26.0		8.5	49 33.0	8.9	A	7.3	20 26.6	10.9	A	8.5	11.0	53.8	A
8.5	38.7	53.0	A	9.0	13.1	12.4		9.2	38.2	25.6		8.0	34.1	38.9	A	6.0	11.0	1.8	A
9.4	54 19.2	58.9		9.2	13.3	57.5		8.8	51 3.4	25.6	A	9.5	43.2	42.0		9.2	30.8	16.3	B
8.5	55 7.4	6.1		9.0	16.9	21.7		9.4	49.5	59.5		9.4	21 16.6	47.6		8.9	40.9	39.0	
9.5	16.0	42.4		8.5	17.4	35.4	R	8.8	52 21.0	16.3	A	9.3	21.3	53.4	B	8.9	42.7	29.1	
8.2	17.2	15.0	B	8.3	21.8	4.1	A	9.2	21.2	56.9	A	9.4	30.1	8.0		9.2	44 16.8	56.8	A
8.1	17.9	11.0	B	9.3	23.7	16.3		7.9	40.3	59.9	A	9.2	31.3	0.2	A	9.4	22.8	22.9	R
7.1	33.0	27.3	F	8.7	19 2.8	3.5	A	8.8	54 3.9	19.8	A	8.3	22 35.9	56.6		6.5	45 6.4	35.6	A

2301—2360				2361—2420				2421—2480				2481—2540				2541—2600			
	21ᵘ—22ᵘ	+60°			22ᵘ	+60°			22ᵘ—23ᵘ	+60°			23ᵘ	+60°			23ᵘ	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	45 26.0	56.5		9.4	8 13.0	44.1		8.7	33 7.4	1.2	R	9.5	0 55.0	6.4		9.5	20 18.3	6.7	
9.5	46 23.9	25.1		8.9	37.1	26.7	A	9.5	12.6	34.0		7.5	1 7.8	2.9	A	8.9	34.6	35.4	A
7.2	45.8	55.8	A	9.3	46.0	51.8		9.5	44.3	42.3		9.5	13.0	17.0		9.5	50.8	33.5	
9.5	47 22.0	46.1	R	9.5	9 12.4	5.5		9.5	45.5	18.5		9.5	20.0	6.0		9.5	59.8	33.3	
9.5	51.6	17.8		9.5	25.2	44.4		9.0	34 20.7	38 6		9.4	21.2	10.0		9.5	21 0.8	35.7	
8.5	48 8.0	30.1	A	9.2	41.1	0.3		9.4	30.0	19.0		9.1	30.2	10.8		8.8	24.2	3.4	
9.5	49 16.8	40.5		9.3	53.7	45.4		9.2	35 25.2	19.6		9.4	38.4	19.7		9.5	29.4	15.8	
9.5	33.8	30.6	A	8.7	10 9.9	59.6		9.1	36 2.1	46.2		9.5	2 11.5	31.7		9.4	31.5	33.4	A
9.4	37.8	16.1	A	8.5	15.6	58.3	B	9.5	12.7	47.1		9.5	27.4	28.6		9.2	37.4	21.5	A
9.2	52.9	58.9	B	8.5	33.1	16.9	R	7.5	38 40.2	45.1	A	9.5	34.0	7.5		7.9	38.2	40.5	A
8.9	57.4	48.3	G	9.5	48.3	31.1		9.5	42.0	19.7		8.3	3 18.9	52.1	A	9.4	44.0	24.0	
9.5	58.9	50.8	A	8.0	11 22.3	6.0	A	8.9	43.5	58.4		9.5	27.2	31.5		9.2	46.3	0.5	
9.0	50 1.8	29.6	A	9.5	24.9	2.4		7.5	39 21.7	3.8	A	9.3	30.2	40.8	B	9.5	22 9.6	30.3	
9.5	6.7	0.2		9.5	35.8	8.3	A	9.5	37.5	8.8		9.4	30.5	2.1		9.3	14.2	2.4	
9.2	23.5	12.5	A	8.7	59.8	8.4	A	9.5	40 16.8	2.7		9.5	4 50.4	43.8		8.7	25.8	38.0	A
9.2	33.4	13.0	A	9.5	12 15.5	42.0		9.5	22.7	14.3		9.3	5 18.9	0.1		9.2	40.5	33.3	
9.4	33.8	9.9	B	9.5	13 2.0	57.2		9.5	41 27.8	59.7		9.5	6 2.1	6.8		9.4	43 6	20.8	
6.5	51 0.0	50.6	A	8.7	10.0	24.3	B	9.5	42 7.8	29.6		9.5	12.1	35.5		9.3	45.9	55.0	
9.5	56.5	28.7		9.2	11.3	23.3		9.5	15.4	36.0		9.5	23.5	29.6		9.5	48.1	48.4	
7.5	52 53.9	35.8	A	8.7	14 5.9	2.5	A	9.5	43 6.9	57.0		9.5	48.6	31.5		9.4	23 6.5	35.4	
7.8	53 21.5	18.9	A	8.3	15.5	20.4		7.5	20.0	22.7	A	9.4	7 0.2	54.5		9.4	20.5	36.8	
9.5	46.0	54.3		9.5	32.5	58.7		9.5	53.3	56.9		9.4	58.2	47.3	B	9.3	27.0	6.7	
7.8	54 37.4	57.6	A	9.1	33.7	12.0		8.5	53.6	33.3	A	9.3	8 14.0	51.3		9.5	24 0.2	3.9	
8.5	55 13.8	24.6	R	8.9	15 20.5	27.2	A	9.2	44 15.7	33.0		9.2	28.6	43.8		9.5	20.3	52.1	
9.3	32.0	36.0		8.8	25.5	21.8	A	9.5	45 19.1	27.0		9.3	52.8	35.0		9.5	23.8	14.0	
9.3	48.0	20.3	R	8.3	30.1	26.2	A	9.4	25.9	40.4		9.3	9 4.9	30.6		9.5	28.0	22.7	
9.5	50.7	11.5		8.2	39.4	51.2	A	9.4	32.5	24.1		9.3	5.9	26.1		8.5	46.7	39.8	A
9.5	56 28.0	54.1		9.4	16 14.3	43.5		9.4	33.5	25.9	B	8.8	30.9	7.5		9.2	56.1	12.2	
7.6	57.6	51.3	G	9.2	31.4	25.2	A	9.5	36.8	29.6		9.1	54 8	53.8		9.4	25 9.0	15.8	
8.1	57 45.6	23.7	B	9.5	57.2	52.8		6.0	44.4	55.6	A	8.6	59.8	49.6	A	9.5	26 3.4	16.0	
7.5	58 39.1	8.7	A	9.4	19 23.0	5.0		9.0	49.4	3.5	A	8.6	10 8.6	44.3	A	9.5	5.3	12.8	
9.0	39.5	31.3	B	9.5	37.1	34.6		9.5	46 34.4	23.6		9.1	38.4	8.0		9.5	37.6	55.5	
8.2	0 8.2	39.4	B	7.5	20 8.1	5.4	A	7.8	47 4.6	8.5	A	9.5	11 9.9	37.0		9.5	40.0	41.2	
7.5	9.7	37.6	G	9.1	45.3	23.7		9.2	37.0	12.4		8.8	29.7	21.7		9.5	42.2	18.2	
8.5	13.1	16.9	A	9.5	22 46.6	15.6		8.8	59.2	20.7		9.5	12 12.0	10.2		9.2	27 5.9	44.0	
9.4	24.6	26.8	B	9.1	23 12.1	31.1	R	8.1	48 17.3	5.1	A	9.0	14.0	40.5	A	9.3	12.6	54.9	
7 5	49.9	1.5	A	7.0	37.7	43.0	G	8.3	20.5	42.9		9.5	14.7	1.5		9.3	20.4	10.2	
9.5	1 23.5	5.6		9.5	53.5	35.6		8.4	49 18.9	50.2	A	9.1	17.7	7.0		8.5	36.7	38.4	
9.5	34.2	16.4		9.5	54.5	37.6		9.5	50 10.0	40.4		9.0	55.6	43.3	A	9.5	54.6	54.0	
9.2	3 5.1	16.8		9.5	56.5	44.3		9.4	18.4	26.6		8.5	13 32.5	33.5		9.4	59.0	50.5	
9.0	14.9	17.4		9.4	24 47 9	59.9		9.5	51 15.0	9.5		7.0	39.6	21.3	A	9.5	28 27.3	35.9	
8.7	21.6	24.7	A	9.3	25 21.2	45.1		9.5	50.1	47.8		8.0	14 19.6	23.8	A	8.3	47.3	6.8	A
8.5	29.9	53.2		7.0	26.6	53.1	G	9.4	52 42.9	24.6		9.2	54.5	10.3		8.5	52.5	34.2	A
9.1	35.4	11.0		9.0	40.8	20.9		9.3	53 9.4	28.1		8.5	15 6.9	18.1	A	9.5	57.8	23.4	
9.5	37.7	48.5		9.4	59.3	52.0		8.7	44.6	21.2		9.3	24.0	3.5		9.5	29 2.5	20.1	
8.5	43.1	22.3	A	9.5	26 13.8	54.9		9.5	59.7	42.9		9.0	41.3	33.0		8.1	6.4	6.2	A
7.5	49.8	31.8	A	9.5	26.7	16.1		9.5	54 28.5	11.9		9.5	56.5	13.8		9 2	25.0	59.6	
7.3	4 4.6	17.4	A	9.4	27 40.3	4.3		9.3	31.6	7.5		9.4	16 18.3	25.2		9.5	37.8	39.8	
9.1	14.3	59.1		9.5	28 15.0	32.5		9.0	55 33.4	47.3		8.7	17 4.4	55.8		9.3	48.3	55.3	
9.1	5 8.4	15.9	A	9.4	18.2	34.2		9.4	47.8	27.6	B	9.4	16.8	3.9		9.2	48.3	25.1	
9.0	13.6	41.0		9.5	19.7	26.3		9.1	49.5	16.6	B	8.7	33.2	28.4		9.5	30 12.3	35.2	
9.1	6 43.5	37.6		9.0	29 34.8	1.3	A	9.1	57 21.4	26.1		8.4	50.4	47.8	A	9.4	13.6	59.2	
9.3	54.8	25.5		9.4	43.5	44.6		8.0	34.5	41.8	B	9.0	18 6.0	22.0	A	8.8	19.4	37.2	
9.1	57.2	32.1		8.0	46.2	4.3	A	8.8	57.4	4.5		9.3	16.2	33.0	A	9.5	37.5	58.8	
9.4	7 1.7	50.7		9.5	30 20.0	47.5		9.5	58 53.8	17.8		neb	18.8	49.5		9.5	31 32.8	3.5	
8.4	3.9	52.5	A	9.3	21.3	0.2		9.5	59 16.5	1.1		9.5	22.5	27.3		9.3	46.3	58.0	
9.5	4.0	46.8		9.3	47.1	8.4		9.3	0 13.9	47.3		9.2	41.7	34.3	A	9.4	59.4	48.4	
5.4	15.1	2.2	A	9.5	31 19.4	10.7		9.5	18.2	2.9		9.0	19 6.7	1.3		8.2	32 10.5	29.6	A
9.4	16.8	26.9	B	9.4	55.3	9.3		6.8	28.6	40.0	A	8.2	21.8	38.1	A	9.5	53.0	18.9	B
9.5	8 9.0	37.8	B	9.5	32 44.7	27.4		9.5	38.4	59.2		7.0	50.8	17.2	G	9.0	33 27.4	32.5	

2601—2614				2615—2628				2629—2642				2643—2656				2657—2669			
	23h	+60°			23h	+60°			23h	+60°			23h	+60°			23h	+60°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
9.5	33 29.9	24.5		8.9	37 45.9	51.7	A	9.3	43 32.7	6.3		9.5	49 23.0	33.6		6.0	54 15.2	23.5	A
9.5	40.9	3.5		9.5	38 11.8	26.0		9.5	44 26.4	15.2		9.1	26.9	35.4		9.0	20.6	11.7	
9.5	54.1	1.6	R	9.1	25.9	13.7		9.4	45 1.5	7.7		9.2	34.2	50.6		9.5	36.8	8.6	
9.2	56.1	59.7	A	9.5	30.4	46.3		9.1	31.6	11.2	B	9.0	49.4	29.5		9.5	55 34.4	33.4	
9.5	34 8.2	56.5		9.5	40 19.6	40.4		8.5	34.4	29.0	A	6.8	50 2.9	12.7	A	9.5	45.5	41.9	
9.5	35 5.4	25.5		9.1	41 28.5	28.0		9.0	46.7	11.8	A	9.4	9.6	33.0		8.6	56 5.4	50.7	A
9.5	15.9	9.7		9.5	37.7	51.2		9.4	54.1	6.3		9.5	45.5	10.7		8.5	30.8	17.6	A
8.5	20.9	40.9	A	9.1	37.9	58.5		7.0	46 39.3	2.6	A	8.9	51.9	13.8	B	9.3	35.0	3.9	
6.5	37.4	52.3	A	9.2	58.4	33.9	R	7.3	47 1.9	47.8	A	9.1	52 15.9	1.6	A	9.2	54.9	42.4	
9.0	36 11.8	57.9		9.5	42 19.4	8.0		9.2	36.3	1.4	A	9.5	53 19.5	41.4		9.4	57 13.9	55.2	
9.0	36.4	22.1	A	8.6	33.0	3.8	R	9.0	48 35.4	27.0	R	9.5	20.0	14.6		6.0	38.4	31.4	A
8.7	46.2	30.1	A	9.5	57.4	41.4		8.8	49.6	51.3	A	9.4	25.0	0.2		8.8	58 32.7	4.2	A
9.5	37 5.1	59.2		9.5	43 7.9	18.6		9.0	49 0.3	38.9	A	9.4	53.4	1.2		8.1	48.4	17.1	A
9.4	28.9	28.9		9.2	25.5	12.4	B	9.5	22.0	0.6		6.8	54 0.1	1.6	G				

Zone +61°

1—20				21—40				41—60				61—80				81—100			
	0h	+61°			0h	+61°			0h	+61°			0h	+61°			0h	+61°	
m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′		m	′ ″	′	
8.8	0 0 2	8.1		9.0	0 8 29	5.8		9.4	0 12 35	50.6		9.5	0 16 5	38.8		9.5	0 18 28	25.7	
8.6	12	34.9		8.5	54	44.8	A	9.1	38	21.8	A	9.5	11	38.6	B	9.3	43	55.6	B
9.5	25	59.8		9.4	55	28.7		7.3	52	4.5	A	9.5	11	50.3		9.4	47	54.7	
9.0	37	30.0		9.3	9 3	20.9		9.5	57	39.4		9.4	13	49.2		9.5	55	38.0	
8.9	50	35.2		9.1	4	25.7		9.4	13 8	58.0		9.5	21	31.0		9.5	19 8	10.6	
9.2	1 2	33.4		9.5	27	18.1		9.5	8	38.7		9.5	27	43.0		8.8	27	55.9	R
9.3	33	52.8		9.5	36	4.2		9.3	29	35.8		8.8	29	2.0	A	9.0	47	28.2	R
9.2	2 1	51.2		9.5	37	18.3		8.3	14 10	22.7	A	9.5	36	29.6		9.2	57	23.0	
8.7	11	47.2	A	9.5	10 7	43.8		9.2	14	13.7		6.1	50	1.5	A	9.5	20 0	2.8	
9.5	13	58.2		9.5	21	13.0		8.2	57	26.2	A	9.0	57	33.0	A	9.5	28	55.2	
9.5	42	33.4		9.5	23	48.1		9.5	15 3	11.4		9.4	17 11	49.1		9.5	38	51.4	
9.1	52	7.6		7.3	40	23.6	A	8.0	23	30.4	A	9.1	15	44.3		8.5	44	42.1	A
9.1	3 44	15.7		9.5	11 19	42.1		9.5	24	4.8		9.5	39	48.4		9.5	21 11	25.5	
9.2	5 15	2.1		9.5	25	49.0		9.5	38	35.3		9.3	56	44.9		7.7	30	15.6	A
8.0	21	54.8	A	9.5	29	21.1		9.3	46	31.7		9.5	18 5	50.4		9.4	32	56.1	
6.7	31	13.7	A	9.3	32	54.8		9.5	48	30.5		9.3	5	41.8		9.5	33	11.6	
9.1	6 42	51.0		9.5	51	0.6		9.4	52	31.0		9.2	21	57.7	R	9.5	55	1.7	
8.4	7 3	22.6	A	8.0	12 14	15.5	A	9.3	54	45.9		9.3	24	18.4		9.3	22 9	14.2	A
9.0	38	54.9	A	8.9	26	39.5		9.4	54	8.1		9.4	24	27.5		9.5	23	50.2	
8.0	51	19.1	A	9.1	33	35.6		9.2	16 2	31.9		8.5	26	34.1		9.5	23	46.0	

101—160				161—220				221—280				281—340				341—400			
	0ᵐ		+61°		0ᵐ—1ᵐ		+61°		1ᵐ		+61°		1ᵐ		+61°		1ᵐ—2ᵐ		+61°
m	° ′ ″		′	m	° ′ ″		′	m	° ′ ″		′	m	° ′ ″		′	m	° ′ ″		′
7.5	0 22 34		33.1	9.5	0 36 3		19.4	9.4	1 2 33		16.2	8.2	1 21 14		9.5	9.2	1 42 55		26.7
9.5	51		50.3	9.1	11		6.4	9.5	3 4		1.7	9.5	47		36.6	9.4	43 2		49.8
9.5	51		33.4	9.0	12		0.9	8.5	23		7.4	9.4	22 10		30.2	9.5	2		39.0
8.9	23 8		32.4	9.2	18		4.7	8.9	26		0.2	8.2	21		33.1	9.0	43		16.9
8.8	9		37.7	6.8	33		44.1	9.3	37		53.0	9.2	57		13.0	9.5	46		29.2
9.1	38		17.6	9.5	39		58.1	9.2	53		37.0	8.7	23 3		8.1	9.5	51		39.5
9.5	47		3.0	9.5	38 1		26.6	8.5	4 23		53.7	9.4	21		1.7	9.5	55		50.4
9.4	24 5		34.0	8.2	13		45.7	8.8	47		51.8	9.1	30		5.0	8.7	44 33		14.9
9.5	29		41.3	9.2	17		1.7	8.7	5 37		55.7	6.8	49		46.8	9.5	43		21.8
9.5	35		28.5	9.5	37		16.2	9.2	50		10.8	9.3	51		51.0	9.5	58		48.8
9.1	49		38.8	9.4	55		9.0	9.5	6 9		7.5	7.6	24 14		24.2	9.2	45 36		25.6
9.5	56		3.4	9.5	39 38		44.5	9.5	36		19.1	9.4	46		37.8	7.8	40		39.5
8.6	25 0		43.6	9.5	40 56		27.5	7.5	51		7.8	9.5	58		34.5	9.3	48		32.1
9.5	23		19.2	9.5	41 4		30.4	9.1	7 12		56.7	9.3	25 6		55.5	9.3	53		24.1
8.0	27		59.1	9.1	54		35.4	9.5	12		17.2	9.5	36		7.0	9.3	46 3		29.4
9.5	35		0.5	9.5	42 12		45.9	9.4	29		31.5	9.4	39		20.7	9.5	17		20.8
9.4	26 5		49.8	9.5	26		36.4	9.0	55		32.4	9.4	26 43		18.2	9.5	44		50.8
8.0	19		47.3	6.2	39		0.9	9.4	8 22		6.1	9.2	43		8.5	9.5	47 10		32.6
8.8	22		49.4	9.3	44 23		43.7	9.5	46		37.8	9.0	58		33.1	9.5	58		21.3
9.4	36		46.2	9.3	45 47		26.0	9.0	9 8		8.3	8.7	27 3		14.9	9.5	49 18		45.4
9.5	38		40.6	9.5	53		52.7	9.5	25		0.4	8.2	6		4.6	8.8	46		2.6
9.5	43		38.6	9.1	47 42		31.0	9.5	44		36.9	9.4	54		49.3	9.5	46		38.1
9.4	44		22.2	9.5	48 5		4.9	9.0	56		32.4	8.0	28 6		6.2	9.5	50 28		30.1
9.4	27 3		44.5	9.3	16		42.3	9.3	56		14.9	6.5	24		36.6	9.5	51 7		32.6
8.3	8		3.9	8.5	38		46.2	9.4	10 28		54.3	9.5	29 13		3.2	8.6	28		2.6
9.4	16		44.9	9.0	38		57.6	9.5	28		48.8	9.5	29		49.8	7.3	39		11.4
9.2	38		14.1	8.9	49 29		8.7	9.0	34		34.9	9.5	30		32.6	9.1	47		38.5
8.7	55		53.1	9.3	52		20.1	9.5	56		10.3	9.5	30 7		18.3	9.5	52 19		58.5
9.5	28 14		54.5	8.3	50 26		8.6	9.5	11 0		18.1	7.8	31 37		56.5	9.2	43		30.1
9.5	18		6.5	9.4	33		10.6	9.0	9		5.8	9.3	32 9		3.5	9.5	53 14		20.8
9.1	42		44.9	8.8	52		28.5	9.2	27		17.6	9.1	14		56.2	9.5	41		42.4
9.5	29 5		45.6	9.2	51 2		52.1	9.0	37		11.8	8.9	33 9		43.5	9.5	43		55.3
9.4	49		41.0	8.8	52 14		9.7	9.3	12 30		27.5	8.1	12		54.3	8.9	54 15		2.7
9.5	30 15		45.8	9.4	32		42.2	9.0	13 49		24.4	8.7	16		21.6	9.5	27		5.6
9.5	18		31.6	9.4	53 26		34.4	9.5	55		51.6	9.2	46		6.6	9.3	37		22.7
9.0	22		3.3	7.8	51		49.6	9.0	59		16.8	7.5	34 19		6.6	9.5	55		50.3
9.5	31		6.3	9.5	54 10		2.2	9.2	14 0		26.9	9.3	29		52.6	8.4	55 5		5.4
9.5	51		13.6	9.0	33		9.9	9.3	6		0.6	9.5	50		21.7	9.5	43		58.5
9.5	52		18.8	9.0	59		31.0	9.5	27		53.4	9.3	35 26		0.7	9.4	56 46		12.9
9.5	31 5		10.0	8.5	55 7		2.7	9.4	15 3		1.0	9.1	50		21.6	9.1	47		10.5
9.3	10		5.9	9.0	12		57.3	9.5	39		29.0	9.0	36 10		25.3	8.9	48		49.3
9.5	16		28.3	8.6	16		38.3	9.5	16 8		43.2	9.5	12		44.8	9.5	57 59		5.2
9.5	19		7.4	9.5	56 12		41.2	9.0	40		20.9	9.5	18		40.0	9.2	58 2		22.8
9.0	37		40.6	9.5	23		35.4	9.5	46		19.6	9.4	38		52.8	9.5	24		44.4
9.5	52		27.0	9.3	31		56.3	9.3	50		34.2	9.5	37 8		49.8	9.5	49		27.2
9.5	32 29		4.5	6.5	57 17		58.6	8.3	17 5		58.0	8.9	32		54.2	8.8	2 0 31		13.2
9.5	50		11.0	9.2	23		37.8	9.1	16		6.1	8.7	38 7		7.5	7.7	42		40.0
9.3	33 1		15.2	8.0	28		53.4	9.4	19 11		4.7	9.0	20		57.8	9.5	1 59		56.1
9.2	2		19.9	9.5	47		48.1	9.5	44		55.2	8.5	42		7.2	9.3	2 2		28.4
9.5	28		30.7	9.5	55		0.1	9.3	47		0.1	9.0	44		6.8	9.2	14		41.0
9.5	50		55.7	8.3	58 46		52.4	9.4	20 8		39.5	9.5	39 14		21.3	9.1	59		42.9
7.8	34 21		58.3	8.8	49		33.4	9.0	18		33.6	9.5	16		12.5	7.6	3 33		0.1
9.2	33		26.4	9.1	59 15		29.0	9.3	22		5.1	9.4	40		4.1	9.3	54		27.2
9.5	53		7.0	9.4	1 0 6		48.6	9.3	48		15.6	8.3	54		24.7	8.9	5 6		32.6
9.5	35 17		7.1	9.4	39		54.0	9.3	50		13.4	9.5	40 9		27.7	9.3	6 13		47.3
9.5	21		25.3	9.0	1 0		46.7	9.5	52		47.9	9.5	31		29.1	9.5	52		47.4
9.5	25		2.4	8.3	3		56.5	9.3	52		59.4	9.5	41 22		22.2	8.0	59		59.7
9.5	36		1.4	8.3	4		2.4	9.1	53		17.4	9.2	35		7.2	9.5	7 20		39.5
8.8	55		22.5	9.5	8		45.2	9.3	55		20.9	9.4	42 14		19.8	9.5	9 4		28.7
9.3	58		13.8	9.3	2 19		58.0	9.1	21 14		0.7	9.5	18		21.3	8.8	27		49.9

401—460					461—520					521—580					581—640					641—700				
	2ᵘ		+61°			2ᵘ		+61°			2ᵘ—3ᵘ		+61°			3ᵘ		+61°			3ᵘ—4ᵘ		+61°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.2	2	10 35	24.6	B	9.5	2	30 57	3.7		9.1	2	56 1	58.2	B	9.4	3	15 4	38.9		7.0	3	37 41	21.2	A
9.4		11 15	18.0		7.0		31 9	44.0	A	9.3		12	16.2		9.2		14	31.1		8.5		38 28	18.7	A
8.5		12 10	33.1	B	8.8		9	6.7		8.5		14	41.7	A	8.8		21	44.1		9.5		39	35.4	
9.4		36	50.7		9.5		13	1.3		9.3		55	42.7		9.3		16 7	44.9		7.0		39 49	53.2	A
7.8		43	6.6	B	9.3		37	0.4		6.5		57 8	49.1	A	9.5		11	21.5		9.5		41 38	38.3	
8.4		51	45.2	B	9.3		48	4.9		9.4		54	6.9		9.5		19	34.4		9.5		50	4.5	
9.5		13 41	4.9		9.2		51	33.3	A	9.5		58 4	16.5	B	8.6		29	58.9	B	9.5		42 20	12.2	
8.2		56	48.7	B	9.5		32 7	30.2		9.5		11	13.7		9.5		33	3.5		9.5		43 17	28.0	
9.5		14 10	12.5		9.5		19	1.0		9.2		29	23.5	B	8.8		58	4.5		9.5		44 26	49.0	
9.5		58	2.5		8.9		47	11.9	A	9.5		41	15.5		9.4		17 6	53.3	B	9.5		45 15	5.6	
9.5		15 42	20.8		8.7		47	9.3	A	9.4		59 3	21.8		9.5		15	10.3		8.7		46 8	24.4	B
8.6		16 17	32.5	B	9.5		48	4.8		9.1		8	2.4		9.5		26	18.1		9.5		46	36.8	
9.0		39	40.0	A	9.5		59	5.0		9.0	3	0 11	58.7	R	9.0		54	9.8		9.0		55	19.6	
9.0		17 6	27.7	A	8.7		33 8	38.7		9.2		28	1.8	B	9.5		18 23	10.1		9.0		48 6	38.8	
9.0		10	8.8		9.1		25	59.5		8.5		32	59.7	A	9.5		25	25.8		9.0		17	15.2	
7.9		20	33.8	A	9.5		47	58.9		9.1		1 18	4.6		9.1		19 27	25.9		9.5		56	28.4	
9.5		18 10	27.9		9.0		34 53	37.7		9.5		39	18.3		8.7		41	28.1		9.5		49 14	0.9	
9.5		19 0	52.3		9.5		58	23.5		9.5		54	21.8		9.0		42	21.7		9.2		47	40.2	
9.0		26	38.2		9.3		35 19	3.0		9.5		2 29	46.5		9.5		55	4.4		9.5		50 39	48.2	
9.5		20 8	57.3		9.5		36 10	26.9		8.0		48	9.5	A	7.0		57	46.2	A	9.5		40	57.5	
9.1		57	36.1		9.5		15	8.7		9.5		3 14	10.9		8.8		20 15	57.8		9.5		54	46.7	
8.3		21 25	9.6		9.5		32	39.6		9.2		59	26.0		8.7		59	56.3		9.2		51 6	47.7	B
9.5		36	25.9		9.0		45	4.7		9.4		5 3	53.8	B	7.9		21 10	44.2	A	9.5		46	21.4	
7.0		41	5.3	L	9.3		37 48	58.8		9.5		6	21.8		8.1		23	39.9	A	9.5		52 7	21.5	
8.5		22 6	56.9		8.5		38 6	15.2		9.2		37	18.4		9.1		24	11.2		7.3		10	55.4	A
9.3		34	57.5		9.3		10	8.7		8.4		39	11.1		9.5		51	18.8		8.4		53 8	46.7	A
9.5		44	7.0		9.4		48	29.1		8.6		44	49.2		9.0		54	8.7		7.5		18	23.5	A
9.5		58	56.9		9.4		53	47.5		9.4		6 29	48.8		9.5		22 19	5.6		7.5		26	12.2	A
9.5		23 9	34.0		7.8		39 27	45.6	B	9.2		36	23.8		9.2		33	20.4		7.0		28	39.6	A
9.5		29	14.2		9.5		48	48.5		9.5		38	46.5		8.8		23 9	47.4		8.0		54 2	55.7	A
9.5		24 4	14.2		9.4		54	31.9		9.5		7 1	16.8		9.3		24 1	29.8		8.7		19	11.9	B
9.5		9	50.4		9.0		41 29	2.2		9.5		6	2.0		9.5		2	8.7		9.5		35	25.5	
9.5		55	31.2		8.5		47	52.2		9.5		20	49.2		9.5		55	51.7		8.3		43	59.8	A
9.5		25 25	25.8		9.2		49	14.9	R	9.0		53	24.5		9.3		25 8	56.7		9.0		45	7.1	B
9.5		37	26.1		8.7		42 33	17.2	B	9.0		55	13.8		9.3		31	13.1		9.5		55 2	53.7	A
9.4		38	33.2		9.0		43 36	18.9	B	9.5		57	4.7		9.5		58	55.0		6.5		9	56.0	A
9.5		46	5.4		9.5		49	2.7		8.7		8 10	56.8	R	9.5		26 2	39.1		9.0		21	17.7	
9.5		53	33.8		9.5		44 10	34.9		8.7		15	59.5	A	9.2		15	34.0	B	9.0		29	53.7	A
9.5		26 10	7.1		9.0		21	41.7		6.5		9 22	28.1	B	9.3		58	19.4		9.0		56 32	36.4	
9.5		16	11.7		9.5		45 9	55.0		9.3		27	10.8		9.3		27 6	12.6		9.5		57 9	45.1	
9.2		27	12.2		8.4		46 4	19.4	A	9.5		31	10.6		9.2		9	36.9		7.5		58 0	20.1	A
9.5		27 6	27.0		9.5		11	7.3		9.5		37	3.4		9.0		41	54.6		9.3		59 10	30.4	
9.5		39	49.1		9.5		23	42.7		9.5		53	46.2		8.7		28 7	21.8		9.5		22	36.9	
6.5		43	57.2	A	9.5		47 25	1.0		9.5		10 39	37.7		9.1		35	55.7		9.5	4	0 22	28.5	
7.5		50	55.9	A	9.5		27	2.2		9.1		11 15	50.3		9.5		39	11.4		9.5		1 56	59.8	
9.2		28 9	4.5		9.5		32	4.9	B	9.1		19	43.1		9.5		29 25	41.9		9.2		3 57	2.0	
8.7		20	48.1	B	9.4		48 47	34.8		8.8		22	51.6		9.1		44	2.8		5.5		4 9	29.0	A
7.0		46	57.8	A	9.2		50 2	5.5		9.5		25	31.5		8.6		47	49.0		9.0		34	56.4	
9.5		59	9.3		9.5		56	54.0		9.5		12 6	0.3		9.5		30 42	23.8		7.9		36	25.6	A
9.4		29 3	5.9		9.0		51 35	58.3		8.3		20	0.9	B	9.5		43	9.2		7.0		52	58.7	B
9.5		14	12.7		9.5		49	2.1		9.5		13 4	34.2		9.4		31 39	55.9		9.3		5 19	32.	
9.5		36	56.2		8.7		52 0	24.0		8.4		9	36.2		9.5		32 3	4.8		7.3		24	3:	
9.5		41	12.2		6.7		20	9.5	B	9.5		15	16.4		9.1		32	48.5		9.4		6 22		
9.5		50	21.5		9.5		53 32	45.1		8.0		15	57.9	A	9.2		53	13.7		7.8		32		
9.5		30 0	22.3		9.0		38	17.3	A	9.5		18	39.7		9.5		34 13	53.4		9.5		39		
9.4		17	5.5		9.2		50	3.7	B	9.5		14 2	51.8		9.5		14	19.6		8.4		4		
9.5		25	29.8		8.5		52	4.8	A	9.4		15	18.9		9.4		18	28.0		9.5		7		
8.4		41	52.6	A	9.1		54 25	0.2		9.1		31	45.6	B	9.5		33	40.3		9.5		8		
9.5		50	3.6		9.4		31	33.3		9.4		33	44.5		8.8		37 15	26.0		9.5				
8.7		56	31.3	A	8.4		35	12.7	A	9.5		54	18.2		9.5		27	6.4		9.4				

701—760				761—820				821—880				881—940				941—1000			
	4h		+61°		4h—5h		+61°		5h—6h		+61°		6h		+61°		6h—7h		+61°
m	h m s		′	m	h m s		′	m	h m s		′	m	h m s		′	m	h m s		′
8.0	4 8	29	52.5	A	9.0	4 56	7	19.5	A	9.0	5 34	41	13.1	A	9.0	6 10	4	2.5	
9.5	9	54	44.7		9.0	57	36	50.3		9.3	35	3	39.0		9.3	11	8	49.4	
9.1	10	11	18.6		8.8	59	8	16.5		9.5		50	43.0		9.2		28	31.2	A
9.5		37	56.0		9.5		22	45.4		9.5		50	41.0		9.1	12	52	31.7	A
9.5	11	7	19.2		9.4		30	20.4		9.4		55	17.1		9.5	13	46	17.1	
9.3		15	40.2	A	6.7		47	39.8	B	8.5	36	7	18.1	A	9.3	16	15	19.0	
6.7		16	40.8	A	9.3		48	50.3		9.5		48	29.9		9.3		16	38.2	
9.3		33	18.2		9.5	5	0 43	49.4		9.5	39	5	6.6		9.3		16	27.9	
9.2		59	1.3		9.5		59	54.8		9.5		46	28.4		9.1	18	8	20.7	
8.8	12	38	30.0	A	9.2	1	7	16.5		9.4		53	24.9		8.0		12	26.3	B
9.5	13	12	49.6		9.0		30	9.2		7.9		56	37.7	B	9.3		29	56.8	
9.5		24	41.5		9.5		45	0.3		8.4	41	46	49.6	B	8.6	22	1	29.3	A
9.3		24	36.5		8.8	2	2	46.4	A	9.5	42	20	8.2		6.1	24	28	35.7	A
9.3	14	9	1.6	A	8.8	3	56	4.3	A	9.5		23	58.9		9.0		48	36.3	A
8.7		46	1.9	A	9.2		59	50.9		9.5	43	32	8.2		8.7	25	20	8.0	
8.5	17	38	44.8	A	9.2	5	4	3.3	A	9.5		36	33.9		7.3		21	35.7	A
8.4	18	4	17.1		9.5		29	4.3		9.5		58	3.0		9.3	26	1	40.5	
8.4	21	9	34.1	A	9.5	7	8	5.6		8.8	45	48	38.3	A	9.5	27	53	16.1	
9.5	22	28	8.1		9.5	8	41	26.4		8.6		49	6.0	B	8.6	29	12	35.9	A
7.0	23	32	3.6	A	9.5	9	28	9.3		9.5	46	21	41.2		9.0		43	2.5	
9.5	26	9	25.3		8.7		35	10.2		9.5	47	23	27.4		9.4	30	19	52.3	A
9.5		14	6.5		7.8		40	37.2	A	9.2		28	19.6		9.5	31	13	47.5	
9.5	30	30	28.8		8.0	11	43	41.1	A	9.3		31	26.1	B	9.0		33	22.9	A
9.5		41	54.7		9.0	12	31	38.7	A	9.5		54	28.3		9.5		57	47.0	
9.5		53	35.1		8.5		56	6.3		9.5	50	41	21.1		9.3		57	37.7	
9.5	31	9	48.5		9.1	13	59	39.3		9.5		56	44.0		9.5	32	57	7.2	
8.6	32	15	23.6	A	9.5	14	22	2.1	B	9.5	51	0	59.5		9.5	34	3	44.5	
9.3		29	18.5		9.5	15	32	59.2		9.5		9	43.5		9.2	35	31	10.0	
8.8		39	26.3	A	9.2	16	46	19.1		8.2		27	54.2	B	9.4	36	53	25.8	
9.5	35	1	45.0		9.0	18	22	28.8		9.3		34	19.1		8.5	37	16	6.0	A
9.1		14	9.2		9.5	19	35	56.8		8.5		38	23.5		9.5		48	40.1	
9.0		29	55.2	A	9.3		35	40.2	A	9.5		58	29.4		8.6		57	2.7	A
9.0		37	56.2	A	8.6		38	8.3		9.5	53	8	39.8		8.7	39	58	15.5	A
7.7	36	6	14.5	A	9.4	20	14	34.9	B	9.5		18	13.2		8.8	40	7	11.6	A
9.0	38	15	16.0	A	9.5	21	0	30.8		9.5	54	0	25.0		8.0		26	11.6	A
9.0		32	52.3		9.1		19	14.1		9.5	56	7	58.4		9.5	41	58	12.1	
9.5	39	45	44.0		9.4	22	18	24.0		8.8		23	27.6	A	8.8	42	21	37.8	A
8.6	40	21	12.1	A	9.5	23	1	30.8		9.2		41	56.9	A	9.2		34	40.6	
6.9		37	13.8	B	8.0		25	18.2	A	9.4		52	2.4		9.1		41	38.4	A
9.2	41	43	31.0		8.2		45	7.6	A	9.4	57	45	1.7	B	9.2		54	45.7	
8.5	42	7	49.0		9.1	25	3	10.5		9.5		56	2.8		9.0	45	45	45.2	
7.1	44	10	30.6	J	9.5		43	30.9		9.0	58	4	32.3	A	8.5		49	31.7	
9.4	45	50	13.0		9.3		58	18.6		9.0		59	29.5	A	9.2		58	33.7	
9.5	46	57	45.5		9.3		58	12.2		9.0	6	1 8	48.1	A	9.5	48	12	7.9	
9.5	47	53	40.0		9.3	26	31	11.1		9.2		42	34.8	A	9.5		49	52.5	
9.0	48	6	57.2	A	6.8	27	4	51.8	A	9.5		44	30.2		9.2		57	30.9	A
9.5		10	33.5		9.1		27	31.7		8.8	2	2	45.2	A	9.3	49	5	32.6	A
9.5		52	33.5		9.5		32	57.9		9.0		40	30.4	A	7.5		42	30.0	A
9.0	50	23	9.5	A	9.5	28	4	18.6		5.5	4	35	31.8	A	9.5	51	8	7.4	
9.3	51	5	13.6	A	9.2		8	14.1		9.1		57	55.5		9.3	52	21	35.9	
9.4		51	39.6		9.5		29	59.2		8.9		55	6.3	A	9.5	53	15	45.7	
9.5		56	43.4		9.5	29	4	15.1		8.5	5	33	7.5	A	9.4		52	5.0	
8.9		59	4.3	A	7.9		17	32.6	A	8.8	7	25	28.9		9.5		56	18.7	
9.0	52	6	56.7	A	9.1		21	2.6		9.5		26	20.0		9.3	54	40	20.7	
9.5		34	52.2		8.8		30	11.8		9.2		37	47.7		8.7	55	14	26.8	
9.1		53	11.5	A	6.5	30	52	22.9	A	9.4		41	48.7		9.3		29	23.3	
9.4		56	8.9		9.5	31	50	58.8		9.5	8	1	48.1		8.9	56	30	36.7	
9.5	55	23	2.9		9.5	33	21	48.6		6.9		43	48.9	G	7.0		38	0.7	G
8.4		30	59.7	A	9.5	34	18	51.0		9.2	9	3	27.4		9.5		49	8.2	
9.0		46	28.8	A	8.9		38	1.0	A	9.5		30	58.3		9.4	57	2	40.4	
9.1	6	58	12	58.5															
9.5			43	10.9															
9.2			54	17.3															
8.7	7	0	13	14.9	A														
9.0			28	48.2	A														
9.5			42	46.8															
9.5		1	32	30.6															
8.7			33	19.7	A														
9.2		2	3	13.4															
9.5		3	41	28.6															
9.1			43	38.0															
9.5		4	16	35.0															
9.0		5	29	17.9															
8.5		6	41	51.1	A														
9.5		7	37	54.6															
9.3			39	32.1	A														
9.2		8	3	6.2	B														
9.2			24	32.3	B														
8.5			51	12.3	A														
9.0		9	9	7.4															
9.0			54	26.2															
9.4		10	52	37.9															
8.3			55	43.8	F														
8.7		12	7	9.7															
9.5			37	29.6															
9.5			38	2.2															
9.5			39	4.9															
9.5		13	33	44.8															
9.5			35	0.6															
9.5		15	43	23.2															
9.4			51	31.1															
8.8		18	2	22.7															
9.3		19	31	33.5															
9.3		20	20	9.1															
9.4		21	14	31.1															
9.0			14	37.5															
9.5			25	57.6															
9.5			41	32.9															
9.4		22	9	46.3															
9.4		23	12	3.8															
9.0			29	49.2	A														
9.5		24	30	27.2															
7.2		25	8	50.7	A														
9.3		26	32	27.6															
9.5			34	9.9															
9.1		28	34	55.1															
8.6			55	24.7	A														
9.4		29	6	20.2															
9.5			21	22.7															
9.3			31	59.0	A														
8.0		30	3	29.1	A														
9.1			8	2.2															
9.4			40	25.6	A														
9.0		32	1	31.6															
9.0		33	4	13.7	A														
9.1			12	41.4															
9.5		34	20	51.1															
9.4		35	3	3.2															
9.5			22	46.8															
9.0			58	20.7															

1001—1060					1061—1120					1121—1180					1181—1240					1241—1300				
	7ᵘ—8ᵘ		+61°			8ᵘ—9ᵘ		+61°			9ᵘ—10ᵘ		+61°			10ᵘ—11ᵘ		+61°			11ᵘ—12ᵘ		+61°	
m	ᵘ ′	″	′		m	ᵘ ′	″	′		m	ᵘ ′	″	′		m	ᵘ ′	″	′		m	ᵘ ′	″	′	
9.5	7 36	2	0.0		9.5	8 25	53	20.2		9.5	9 17	44	50.3		9.5	10 9	43	29.8		9.5	11 16	19	5.3	
9.5	38	21	42.3		9.1		58	5.9	A	9.5		52	29.3		9.5	10	52	58.8		8.8		19	41.1	A
9.4	39	29	59.0		9.5	28	8	5.9		9.1	18	0	39.6	A	7.3	11	49	37.4	A	9.3	19	18	31.8	
9.0	40	31	0.7	A	8.9		29	27.5		9.5		15	0.2		9.5	12	8	38.9		8.8	20	11	21.1	
9.0	41	42	25.6	A	7.7		45	7.3	A	8.8		31	44.4	A	9.0	13	26	27.1	B	9.2		32	14.2	
9.3		43	23.1	A	9.2	29	24	50.9	A	9.5		53	14.5		9.3		47	22.1		6.0	24	6	52.1	A
9.4	42	3	40.9		9.3		45	43.2		9.0	19	11	45.9	A	9.5	14	19	56.5		8.5		50	25.2	A
9.4		59	4.3	B	8.6		54	47.7	A	9.3		29	44.5		9.0	16	18	21.6		9.4		56	40.3	
9.4	43	26	3.5		8.8	30	5	56.5	A	9.5	22	9	27.3		8.7		27	5.1		8.9	26	40	29.3	A
9.5		34	1.7		7.5	31	5	25.6	A	9.0		47	40.1	A	9.0	17	8	34.3		9.5	27	14	54.7	
9.5		40	1.2		8.5	32	47	38.9		8.2	23	19	36.7	A	9.4	19	19	1.8		9.2		22	50.7	B
9.1	44	21	33.5		9.5	33	19	16.3		7.5	24	15	31.7	A	9.3	20	44	1.1	B	9.5	28	1	6.8	
8.9		33	41.8	B	9.5	34	35	22.7		9.5		50	18.0		9.5	22	53	47.6		9.5		57	32.1	
9.5	45	37	1.1		9.3	35	36	16.7	A	8.0	25	1	52.3	A	9.5	24	10	54.4		9.1	29	37	57.7	
9.1	46	7	31.6		9.1	36	16	25.0	A	9.5	27	19	3.0	B	9.0	25	39	3.3		9.5	30	17	2.8	
8.5		21	43.8	A	9.0	37	28	29.0	A	8.5	28	52	21.4	A	9.3	26	8	15.7		9.5	31	55	45.9	
9.4		37	47.3		9.2		30	27.9	B	8.6	29	30	8.6	A	9.1	29	7	24.5		9.5	32	7	17.5	
9.5	48	7	30.6		7.8	38	2	46.2	A	9.4	30	35	49.1	B	9.5	31	36	8.3		6.8	33	8	38.6	G
9.1	49	1	9.9		9.5	39	54	35.4		9.4		46	47.1	B	9.3	34	4	30.9		9.5	34	49	18.5	
9.2		19	1.1		9.1	40	30	24.1		9.5	31	1	52.6		9.5	35	0	14.1		9.0	35	2	22.8	A
6.5		44	22.7	G	9.0		33	6.3	A	9.5	34	33	42.0		9.5		54	28.0		9.0	36	4	35.5	A
9.5	51	10	14.4		9.2	41	19	58.5		8.8	36	57	44	A	9.0	38	20	38.8		9.4		24	8.5	A
9.5		10	5.7		9.5		48	29.1		8.9	38	19	45.9	R	9.0	40	21	18.7		9.5		37	41.0	
9.5		58	19.3		8.5	43	56	42.2	A	9.1		49	7.1	A	7.8		56	22.5	B	9.5	37	31	50.4	
9.4	52	29	40.0		9.0	45	36	50.1		8.8	39	16	0.2	A	9.5	42	16	36.8		9.5	40	36	20.9	
9.0		42	49.4	A	9.4		43	30.0		8.3	40	35	17.5	A	9.2		55	9.8	A	9.5	44	49	59.2	
9.5	54	43	30.2		9.3		49	5.3	B	9.0	41	3	19.0	A	9.1	43	26	33.3		9.3		53	49.4	
8.7	55	12	5.6		8.2		53	37.8	A	9.5		31	46.0		9.0		43	50.9	A	9.4	45	13	9.7	
9.5	58	26	27.5		9.5	46	17	10.1		8.8		47	48.5	A	9.3	44	28	40.1	B	9.0	46	39	49.9	A
9.5	8 1	22	59.9	B	9.4		52	51.6		8.8		54	25.3	A	8.7	46	33	2.1		9.5		43	29.1	
9.4		55	16.8	B	9.1	47	3	12.7		6.4	44	27	48.4	A	8.7		37	14.2	A	9.5	47	30	18.0	
9.5	2	10	21.5		9.0	48	20	46.6	B	9.5		53	4.1	R	9.5	48	17	47.6		8.7	48	34	28.5	
8.5		37	31.9	A	8.5		21	39.3	A	9.2	47	29	3.1	R	9.5	49	41	30.9		8.7		35	48.4	A
9.5		55	29.5	B	9.5		25	47.6		9.1	49	6	20.4	A	9.2	51	4	20.1		7.8	49	10	18.5	A
9.4	3	16	10.8	A	9.4	50	15	51.5		8.5	50	5	59.8	A	8.5		44	48.1		7.3	50	16	16.0	A
9.4	4	24	49.6	B	9.5		58	36.9		8.8	51	46	39.4	B	9.3		46	19.2		9.5	51	33	59.2	
9.1	5	4	47.5	B	9.4	52	18	25.1		8.8	52	0	14.0	R	8.8	53	42	27.0		9.5	55	22	37.6	
8.0		52	54.0	A	7.5	53	3	33.4	G	8.5		51	37.2	B	9.0	56	38	10.8		9.5		56	52.7	
9.1	6	19	27.0	A	9.5		34	39.6		9.1		55	33.9		9.5	59	53	9.6		9.4	56	33	33.1	
9.5		19	14.8		9.5		50	42.6	B	8.8	54	59	51.8	A	8.5	11 0	27	0.4	A	8.8	57	7	59.7	A
9.0	8	36	54.0	L	7.7	55	35	5.8	A	9.5	55	8	35.2		9.5		29	51.4		9.3	12 0	47	18.2	
9.4	10	25	54.3	A	8.5	57	47	7.9	A	9.5		33	30.3		9.0		58	53.9	A	9.3	2	29	43.9	A
6.7		33	4.9	A	9.5	59	18	11.4		9.1		54	15.0	R	7.3	1	5	33.3	A	7.9	5	54	12.2	A
9.0		43	39.7	A	9.5	9 1	14	57.6		8.8	56	28	37.7	R	9.5	2	37	32.3		7.5	6	58	15.4	A
8.5		53	55.0	A	9.4	2	28	44.2		7.0		54	37.4	B	9.3		48	57.8	B	8.3	7	9	12.0	A
9.4	11	1	36.5	B	9.3	3	26	43.5	B	8.9	57	50	38.7	A	7.9	3	25	58.9	A	9.3	8	27	17.4	A
8.9	13	4	41.3	A	9.5	4	3	49.5		9.1	59	9	50.5		9.1		26	12.4	B	9.1		51	11.4	A
9.0	15	14	35.9		9.2		17	43.6	B	9.0	10 0	8	33.7	A	8.3		32	54.4	A	9.5	10	34	41.0	
9.3		26	13.3		8.5		44	9.4	A	9.5	1	20	12.6		8.7	4	42	17.6	A	7.7	11	19	8.0	A
9.3	16	5	46.7		9.0	5	3	20.4	A	7.8	2	28	13.0	R	8.0	6	42	32.6	A	9.1		41	22.2	
8.4		18	37.9	L	8.0	7	23	29.3	A	9.4		33	3.4		9.0	7	8	38.3	A	9.2				
8.5		29	25.0	A	9.3	9	6	46.4	A	7.5		33	47.5	R	8.5		9	25.5	A	7.2				
9.3	17	22	25.2	A	9.3		10	56.2	A	9.5	3	39	1.3		8.8		55	23.0	A	8.0				
3.3	18	13	11.1	A	7.5		26	59.3	A	8.0		42	19.5	A	9.3	8	33	0.3		7.3				
9.1		54	27.5	A	8.5		28	48.7	A	9.0	4	30	20.0	A	6.5		53	3.6	F	7.[illegible]				
9.5	20	56	9.3		8.9		59	1.2	R	9.5	5	23	19.5		9.5	9	31	47.1		[illegible]				
9.5	22	12	0.9		9.5	11	21	26.8		9.5	6	3	2.0		9.0		54	23.3	A					
9.4	23	57	18.8		7.3	13	4	3.1	A	8.8	7	6	58.8		8.5	12	51	22.5	A					
8.9	24	19	37.9	A	9.3		39	38.7		8.8		55	31.7	R	9.3	13	14	2.3						
9.0	25	6	58.9	A	9.5	17	20	19.5		9.5	9	43	39.2		9.5	14	20	11.2						

1301—1360					1361—1420					1421—1480					1481—1540					1541—1600				
	12ᵘ—13ᵘ		+61°			13ᵘ—14ᵘ		+61°			14ᵘ—15ᵘ		+61°			15ᵘ		+61°			15ᵘ—16ᵘ		+61°	
m	ᵘ	′	″ ′		m	ᵘ	′	″ ′		m	ᵘ	′	″ ′		m	ᵘ	′	″ ′		m	ᵘ	′	″ ′	
9.5	12	26	27 23.8		9.2	13	25	19 15.6	B	9.5	14	16	48 55.5	B	9.3	15	4	19 13.3		9.5	15	46	58 58.7	
9.3			40 5.4		9.5		27	15 43.2		6.8		18	26 37.9	G	9.4			42 14.8	A	9.4		47	22 13.2	A
9.5		28	16 19.5		9.5			45 7.5		9.0			41 15.7		9.5		5	39 1.1		8.0			26 47.0	A
9.1		31	44 46.8	A	9.1		28	28 13.3	A	9.0		19	40 43.2		8.3			48 21.2	A	9.5		49	20 15.8	
9.4			54 42.9	B	7.8			30 32.9	A	9.5		21	29 45.7		9.0		7	7 15.1		9.3		51	5 48.1	A
9.5		32	17 46.4		7.3			34 0.1	A	9.1			30 21.7		9.5			33 48.7		9.5			8 17.9	
7.2			29 49.0	A	9.0		29	58 54.6	A	8.2			50 25.0	A	9.2		8	4 46.3		9.5		52	6 14.7	A
9.4			51 7.2		9.5		31	52 51.1		9.5		22	25 7.8		9.5		9	48 11.4		9.5			23 21.8	
7.0		33	7 41.1	A	9.0		32	55 23.1	B	9.2		23	38 36.4		9.2			55 19.9	B	9.1			24 57.6	
8.5		34	25 36.6	A	8.9		33	57 50.6	B	9.1		24	2 31.9	R	9.1		10	16 28.3	B	9.5		56	4 12.8	
9.2		35	39 40.2	A	9.3		34	54 27.0		9.5			49 58.4		9.5		14	57 54.6		9.0			30 15.3	B
6.5		36	42 56.9	A	9.4		39	24 57.5		7.2			58 1.8	A	9.0		15	1 6.0	A	9.3			36 52.2	
var		37	35 53.3	B	9.4		40	37 32.9		9.3		25	31 7.9	B	9.5			41 2.1		9.5		57	39 36.5	
9.5		38	13 29.7	B	8.8			53 0.9		9.4		26	12 17.4		9.5			44 28.2		9.5	16	0	31 4.4	B
9.2			16 17.5	A	9.5		41	27 48.2		8.1			54 25.1	B	6.8		16	26 53.1	G	9.2			33 41.1	A
9.4			21 24.9		9.2		42	1 36.4		9.5		27	8 38.8		9.0		17	47 48.2	J	9.2		1	11 8.4	A
9.5			47 29.8	B	8.2			31 25.6	A	8.2			11 3.1	A	9.5		18	54 6.0		7.6			13 43.5	A
9.5		39	42 55.1	B	9.5		43	39 31.0		8.8			18 50.6	A	9.0		19	23 13.9		9.0			20 52.1	A
7.8		42	11 36.7	A	9.0		44	2 35.9		9.5		28	7 6.9		9.5		20	2 8.0		9.5		2	35 1.3	
6.0			22 6.5	A	9.5			45 58.9		9.5		29	8 19.2		7.5			16 30.4	B	9.5			47 51.7	
9.4			44 39.7		7.5		45	20 15.3	A	9.5			27 53.5	R	7.2		21	27 2.8	G	8.8		3	25 58.3	
9.3		43	0 56.4	B	9.0		46	41 23.5	A	8.9		31	37 28.0		8.8			27 49.3		9.4			28 8.2	B
9.4			47 45.4		9.5			59 2.2	B	8.8		32	21 52.0		9.5		22	47 47.8		9.5			57 25.3	
9.0			51 13.5	A	9.5		47	32 3.7		9.4		33	19 38.3	R	9.5			53 24.1		9.4			58 55.8	
9.4		44	46 21.9		9.3		49	39 31.5		9.1		34	41 49.1		9.3			57 2.4	A	9.1			59 41.0	
9.5		47	11 42.0		9.2			54 4.8	A	8.0		35	12 20.7	B	9.5		23	9 11.2		9.2		4	24 2.7	A
9.1		50	1 9.2	A	8.8		50	24 15.7	A	9.5			35 58.4		9.5			27 1.2		9.0			31 47.0	
9.4		51	36 39.1		9.0		51	39 32.4	A	9.4			41 54.0		9.3			45 29.1	A	8.8		5	24 10.0	A
9.5			45 0.7		9.0		52	28 30.5	A	8.5		36	10 4.0	B	6.2		24	59 10.9	A	9.4		6	16 25.6	B
8.5		52	43 4.8	A	8.5		53	29 59.6	B	9.2		38	23 33.9		9.5		25	45 0.6		9.5		8	34 26.4	
9.3		54	27 41.5		9.5			35 0.0		6.0			25 52.5	A	9.5			48 51.2		8.8		9	24 33.2	A
9.0		56	12 12.5	A	9.2		54	1 54.5		8.7		39	4 10.2		9.3		26	42 22.7		9.5		10	8 42.4	A
9.5			15 15.9		9.5			12 4.2		9.5		40	7 56.8		9.5			51 56.6		9.5			16 32.7	
9.5		58	31 17.0		9.0			28 40.3	A	6.3			28 42.7	A	9.5		28	7 19.9	B	7.5		12	43 1.0	A
8.3		59	25 38.2	A	9.0			44 30.0	A	9.5			50 0.8		8.8		29	49 2.4	A	9.2		13	2 8.1	A
9.1			27 36.7	B	8.7		55	17 28.1	A	7.5			50 23.1	B	9.5		30	41 21.8		9.4			29 49.0	B
9.5	13	0	10 21.0		8.2			19 38.9	A	9.5		42	31 9.4		9.5		31	31 6.9	B	7.8		14	0 14.5	A
9.5		3	2 48.4		9.5		56	1 51.7		9.5		43	27 37.9		8.7			39 24.3	B	9.3			9 47.7	B
9.5			46 59.2		9.4			13 57.3	B	9.0		46	31 16.3		9.5		33	14 42.8		9.5			20 45.9	
9.5		5	29 28.3		9.5		57	24 16.3		9.5		48	20 30.6		9.5		34	55 3.5		9.3		15	1 39.6	
9.3		7	18 4.9	B	9.4			49 39.8		9.5			21 21.2		9.0			55 40.4	A	7.7			25 43.0	R
9.4			28 47.5		8.3		59	37 15.5	B	8.8			33 6.4	B	9.5			55 30.2		9.4		16	35 39.6	
9.5		8	23 48.0		9.5	14	0	0 51.5		9.3		49	32 6.3	B	7.7		35	34 52.9	A	9.0		17	4 47.0	
8.1			56 31.3	A	9.3		3	24 0.5		9.0			35 53.4	B	9.5			52 14.9		8.8			17 7.8	A
9.5		11	13 1.3		9.5			58 29.0		9.3			44 17.9		9.5		36	7 15.4	B	9.1			42 53.7	A
9.0		12	25 48.9	A	9.1		4	43 47.2	A	9.5		51	20 1.1		9.3			28 33.7		9.4		18	10 33.2	
9.1			55 32.1		9.5		5	18 4.9		9.5			48 13.5		9.4		37	33 14.9		8.5			19 50.3	A
9.4		14	0 30.8		8.0		6	40 5.4	A	8.8		53	16 19.0		9.4			5 41.0		9.5		19	31 53.6	
9.5			38 38.7		7.5		7	22 10.3	A	9.4			56 19.0		9.3		39	3 12.3		8.9		20	16 56.3	B
8.0			43 9.7	A	9.3			29 36.9		9.5		55	28 43.3		9.2			13 4.1		7.8			50 46.0	A
8.8			43 59.7	A	9.5			35 29.5		9.5			46 18.3		9.0			51 40.8		2.5		22	4 49.4	A
7.8		15	19 0.5	A	9.0		8	55 42.7		9.2			57 10.2		9.5		40	31 54.8		9.5			35 22.8	
7.9			51 50.5	A	9.3		9	47 51.1	B	8.4			59 40.3	B	9.5		42	46 14.9		9.1			54 32.3	A
9.5		16	51 21.5		9.5		10	46 37.8		9.5		56	33 55.1		9.4		44	16 14.1	B	9.5		24	57 16.0	
9.1		21	31 4.4		8.2			51 58.9	A	9.5			44 1.6		9.3			37 52.6		8.1		26	4 0.7	R
9.0			37 58.7	A	9.4		11	35 29.5		9.2		57	22 50.2		7.9			55 27.3		9.5			40 47.5	B
9.5		23	22 48.0		9.5		13	0 50.6		9.5		59	49 36.0		9.5		45	22 20.4		9.0		29	46 18.0	
9.2			39 57.8		9.4		14	18 8.4		8.9			57 50.8	B	9.3			27 11.0		6.0		30	24 7.8	A
7.7		24	41 6.2	B	9.5		15	42 13.3		9.5	15	1	12 38.0		8.6		46	15 52.5		7.8		31	23 32.2	A
8.9		25	18 5.1		9.5		16	11 1.3		9.5			38 28.1		9.3			4ᵘ 55.5		9.1		32	24 2.6	

1601—1660					1661—1720					1721—1780					1781—1840					1841—1900				
	16ᵘ—17ᵘ			+61°		17ᵘ—18ᵘ			+61°		18ᵘ			+61°		18ᵘ—19ᵘ			+61°		19ᵘ			+61°
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	
9.2	16	32	39	51.4	9.5	17	24	30	9.4	8.6	18	3	23	24.9	B	9.1	18	46	11	47.0		8.4	19	15	52	4.6	A
9.4		33	54	46.0	9.0			51	31.9	A	9.0		5	37	13.9	A	9.0		47	42	47.2		8.0		16	9	37.4	A
9.3		34	38	4.3	8.9		25	41	1.2	A	9.5			44	13.0	A	8.3		49	4	48.7	A	8.9			39	47.2	
7.0		36	16	27.5	B	9.3		26	44	10.0		8.6			57	12.9	A	9.3		51	35	28.7		9.5			45	31.4	
9.5			24	44.5		9.2		27	20	37.9		9.2		7	54	55.0	A	9.3			57	54.0		9.5		18	18	13.3	
9.3		41	15	9.3	A	8.7			53	44.6		8.8		8	13	58.0	A	9.5		52	12	53.5		8.9			19	7.7	
8.5			51	5.5	A	8.5			57	11.8	A	7.0			32	51.2	A	9.2		53	25	31.4	B	9.4			44	59.3	B
9.5		42	21	27.1		9.5		28	24	12.7		8.0		9	12	9.0	B	9.5			48	41.2		8.5		19	16	29.0	R
7.5			23	14.3	A	8.0		30	9	48.1	A	9.1			31	57.0	A	9.1			56	16.7		9.5			23	53.0	
9.5		43	0	52.5		9.4			58	2.5		8.9			53	28.4	B	9.2		54	49	49.7		9.5		20	5	0.4	
9.2		45	30	56.0		9.5		31	29	58.5		9.4		10	17	28.7		9.3			52	32.4		9.5			55	6.3	
9.4		46	8	18.2		9.4			32	51.1		9.5		11	13	12.0		9.3			54	17.7		9.0		21	10	59.4	
9.5		48	21	27.0		9.3		32	28	38.8	A	9.2		12	15	56.0	A	9.5		56	3	11.8		9.3			45	12.2	
9.4			46	59.6	B	8.7			29	38.1	B	9.0		13	24	57.0	A	9.4			32	15.3		9.0		22	20	55.5	
9.3		49	44	58.5	B	8.5			30	48.6		8.9			35	30.1	A	9.5			36	43.1		9.5			33	12.2	
7.6		50	31	53.0	A	9.5			37	9.4		9.5		14	35	29.2		9.5			36	49.7		9.5			53	17.5	
9.5			48	35.4	A	9.1			54	8.3	A	9.4		15	15	15.4	A	9.5		57	1	29.8		9.5		23	5	23.5	
9.5			53	42.6		6.0		33	30	58.8	G	9.5			33	50.7		9.5			19	29.1		9.5			5	19.2	
8.0		52	24	52.1		9.4			38	27.0		9.3		17	3	19.3		8.8			51	28.5	B	8.3			5	8.6	A
9.4			37	11.8		9.5		34	8	8.7		9.4			26	35.5		9.5			59	56.0		8.7			27	4.6	A
9.2			49	28.0		9.4		35	18	46.1		8.8		18	46	22.3		8.5			59	35.6		9.5			38	31.9	
9.5		55	1	19.1		9.3			29	46.0	B	9.4		19	20	32.0		8.8		58	15	27.9	B	9.5			49	40.3	
7.5			8	41.8	B	8.3			37	2.8		9.0		21	5	11.5	A	8.0			25	12.8	A	9.5		24	3	29.0	
9.3			21	38.9		7.8			43	47.6	A	9.5			12	49.8		9.5		59	34	22.5		9.4			48	11.8	B
8.8			28	49.1		9.4		36	55	0.3		9.0			31	16.3	A	9.1			37	31.7		9.5		26	17	3.6	
9.5			34	20.1		9.5		37	6	2.5		8.6			43	34.6	A	8.9	19	0	3	33.6		9.4			51	48.0	B
8.9		57	20	21.6	A	8.2			33	23.5		9.2		24	28	25.7		9.0			57	16.2		8.5		27	23	0.4	B
9.1			57	0.7	A	9.0			37	8.0		9.5			50	4.3		7.0		1	56	52.9	A	9.1			59	51.5	
9.1		58	26	2.3	A	9.4			50	46.8	A	9.4			51	54.2		9.5		2	15	25.5		9.1		28	2	27.1	
9.5			36	41.3		9.1		38	2	48.1	A	8.3		25	21	17.3		9.5			27	32.4		8.9			27	48.5	B
8.7			54	13.7	A	9.3		39	2	0.9		8.9		26	24	27.7		8.8			39	41.8		8.9			29	34.2	
9.2	17	0	20	41.7	A	9.0			20	8.2	B	9.5		29	7	4.5		9.5		3	18	10.0		9.3		29	17	37.9	A
9.2			43	40.8	A	8.5			51	40.3	A	8.6		30	10	20.8		9.4		4	5	40.5		8.4		30	13	37.9	A
9.4		1	56	30.5	A	9.4		40	21	21.1	A	8.3			19	40.4	A	9.4			6	35.1	B	9.5			18	5.4	
9.5		2	16	11.3		9.5			28	32.9		9.2			37	34.5	A	9.5			28	16.1		9.4			24	0.5	
7.7			27	22.1	A	9.4		41	8	23.0	A	9.5		31	53	14.6		9.3			52	2.5		9.5		31	25	15.2	
8.5		4	42	29.5	A	9.1			36	50.6	A	9.5		32	55	30.1		7.7		5	22	4.2	A	7.8			31	43.2	A
9.3		5	28	18.3		9.2			44	37.8	A	9.3		34	33	36.3	A	9.2			35	6.3		9.5			48	1.4	
9.2		6	9	49.6	A	9.5		44	44	42.5		9.4		35	2	11.0	A	7.4		6	12	27.1	A	9.5		32	35	3.1	
6.8			28	20.1	A	9.4			50	14.7	A	9.5			7	31.6	B	7.5			16	22.1	A	9.5			48	30.0	
9.2			45	30.0	A	9.5		46	0	18.5		9.5			19	32.1	B	7.5		8	10	42.5	F	9.4		33	11	41.3	
9.0			51	32.0	A	9.2			16	30.6	A	8.5			23	34.5	A	8.8			17	33.3		9.0			33	19.2	
9.5		8	29	47.2		9.4		48	34	51.1		9.2		37	40	9.0		9.5			51	5.1		9.0			48	42.2	
9.5		9	1	29.4		8.8		50	21	27.2		8.9		38	16	36.9	A	9.5		9	37	33.1		9.5		35	17	16.9	
8.2		10	10	58.8	A	9.3			32	49.3		9.3			59	13.9		9.5			39	26.7		9.5		36	33	54.5	
9.5		14	6	48.7		9.5		51	50	49.3		9.4		39	23	37.1		9.1		10	17	0.1		9.5		37	38	4.6	
9.5			54	57.0		7.3		52	1	4.6	L	9.0			25	33.8	A	9.0			19	50.2		9.5			50	35.0	
9.5		16	25	59.3	A	9.5		53	22	14.9		7.5		40	6	24.2	A	8.5			56	22.6	A	8.7			50	40.5	B
9.0			38	17.7	A	9.5			57	0.1		9.0		41	38	38.9	A	9.3		11	17	28.0		8.6		38	56	34.6	
9.5		17	18	4.6		6.8		54	13	25.2		9.5		42	34	9.4		9.5			57	8.5		9.4		39	13	7.2	
9.5			39	17.2		9.4		55	3	27.2		7.9			53	48.2	A	7.5		12	8	55.5	A	9.5			30	10.6	
7.9			41	53.5	A	9.3			35	2.6		8.5		43	8	28.2	A	8.8			36	46.2		9.4			31	1.9	
9.0		18	26	48.3	A	9.5			56	36.1		9.5		44	6	16.4		9.5		13	27	48.7		9.2			32	18.1	
9.3		19	5	56.5		9.5		56	54	15.4	A	9.5			12	16.9		9.5			35	46.7		9.5			51	43.7	
9.5			9	7.7		9.5		58	4	37.5		8.9			25	11.4		8.0			46	18.5	B	9.4		40	20	19.0	
8.9		20	19	52.5		9.4			7	57.2		9.3			28	51.0		9.5			46	40.7		8.8			22	23.8	A
9.4		21	50	20.6	B	9.5		59	51	44.9		9.2			30	13.7		9.3			55	37.2	B	8.9		41	2	15.8	
7.0			58	7.7	B	8.1	18	2	35	33.4	B	9.4			33	52.4		9.5		14	36	4.6		9.5			11	28.8	
9.2		22	47	57.9	A	9.2		3	15	54.7		9.3		45	55	20.3		8.0		15	12	42.7	A	9.5			52	31.5	
8.8		23	14	32.4	A	8.5			23	52.7	B	9.2		46	11	51.0		9.5			47	8.1		8.4		42	9	31.5	A

1901—1960				1961—2020				2021—2080				2081—2140				2141—2200			
	19ᵘ	+61°			19ᵘ—20ᵘ	+61°			20ᵘ	+61°			20ᵘ—21ᵘ	+61°			21ᵘ	+61°	
m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′	
9.4	19 42 17	13.4		7.7	19 59 27	45.6	R	9.2	20 26 23	23.4	B	8.8	20 58 31	33.6	A	8.0	21 25 10	21.9	A
9.3	25	50.4		8.9	38	5.9		9.3	27 28	16.1	B	9.4	50	50.0		9.5	11	1.6	
9.4	42	45.8		9.1	41	49.8	B	9.4	40	6.6		9.3	59 33	2.2		8.5	26 3	6.5	A
9.5	43 7	19.5		8.5	58	32.1		9.4	28 6	57.1		9.3	41	52.7		9.5	4	3.5	
9.5	39	31.5		9.3	20 0 26	46.3		9.5	38	47.3		9.0	56	39.9	A	9.3	51	25.8	
8.8	44 34	37.3		9.3	2 6	39.2		7.8	29 5	58.1	A	7.8	57	24.8	A	9.0	51	4.8	A
9.0	45 11	5.0	A	9.1	28	35.7	B	8.8	30 33	53.9	B	8.1	21 0 3	39.0	B	8.3	52	12.1	A
9.5	17	6.7		9.1	3 1	41.9		7.3	31 12	15.8	A	8.9	51	57.3	R	7.8	54	15.5	A
9.2	21	4.6		9.3	7	17.4	B	9.5	34	5.9		9.3	1 5	43.6		8.5	27 18	37.6	
9.0	21	2.6	A	5.0	14	33.6	G	8.8	32 6	59.2	A	8.3	36	18.7	A	9.5	58	17.5	
9.3	38	13.0		9.5	23	23.2		8.5	25	31.6		7.3	49	15.0	A	8.3	28 0	5.8	A
7.4	59	2.7	A	8.5	55	3.0		8.0	31	58.1	A	7.3	2 18	35.6	A	9.3	44	7.8	
9.5	46 16	21.5		9.3	4 36	55.1	R	8.6	50	1.5	B	9.5	3 20	15.5		9.1	29 6	19.5	
9.5	19	31.5		8.3	59	17.4		9.4	33 1	5.5		9.5	4 7	29.3		9.1	6	23.3	
9.1	29	44.1	B	6.8	6 38	39.0	A	9.4	28	40.9		9.5	16	14.5		7.8	30 7	8.9	A
9.5	32	38.1		9.3	51	54.4	R	8.2	36	18.5		8.5	20	38.7	A	9.1	11	32.6	A
9.5	49	38.1		9.4	7 10	49.8		8.1	40	30.5	B	9.1	5 9	31.8		8.5	32	50.8	
9.5	50	7.7		8.7	34	2.6		9.2	54	58.4	A	9.3	8 27	37.7	B	8.3	43	39.2	A
9.5	59	19.2		9.5	8 5	45.3		8.0	57	55.6	A	9.0	9 12	16.5		9.0	45	13.5	
9.5	47 21	40.2		9.4	29	28.7	R	9.2	34 21	54.8	A	9.5	13	9.7		9.5	31 1	32.7	
9.4	43	47.1		9.1	32	35.0	A	9.5	40	31.1		8.8	18	33.2	A	9.5	46	49.5	
9.4	44	49.4		8.7	48	12.4		9.3	35 35	13.4		9.5	10 1	21.8		9.0	58	52.3	
9.4	57	58.7		5.8	9 12	39.0	A	9.5	47	2.6		8.9	30	4.2	A	8.8	32 24	22.8	A
9.0	48 2	34.5		8.9	25	18.9		9.5	37 35	43.3		8.8	11 39	51.8	R	9.5	54	18.0	
9.4	17	4.3		9.1	57	17.3		9.3	39 9	36.7	B	9.1	56	22.3		9.0	33 17	10.5	
9.4	26	25.8		9.3	10 8	45.8	A	9.4	40 32	54.6		9.0	13 50	44.9	A	7.6	22	39.6	A
9.1	37	23.9		9.5	23	48.8		9.5	41 21	0.1		9.3	55	57.9		9.3	51	25.8	B
9.3	49 22	26.0		9.1	57	26.1		9.0	30	4.5	B	9.5	14 15	17.5		9.4	52	26.4	A
9.5	41	25.6		9.5	58	10.0		8.9	42 17	25.8		7.5	47	10.1	R	5.0	34 5	24.8	A
9.3	50 4	42.4		9.5	11 20	36.0		3.7	21	17.0	A	9.2	52	18.4	B	9.3	9	45.0	
9.3	4	23.7		9.1	35	50.8	A	8.2	41	52.1	A	3.0	15 10	58.4	A	9.5	14	17.5	
8.2	10	35.9	B	8.9	13 5	50.7	A	9.5	43 35	16.5		6.7	37	14.5	A	9.4	16	28.8	
9.5	12	51.7		8.8	20	2.6		9.4	52	23.9		9.4	42	14.9	A	9.5	26	44.6	
9.5	27	59.7		9.3	14 32	41.0		9.4	44 22	15.1	B	8.0	43	21.0	B	9.3	29	45.8	B
9.4	51 8	49.2		9.5	50	4.7		9.1	56	49.2		8.5	16 11	35.6	A	8.3	35 2	9.1	A
9.5	32	45.0		8.2	56	41.4	A	9.1	45 36	17.9	A	8.8	33	9.2	A	9.5	21	48.9	
9.5	53	53.7		9.4	15 10	33.6	A	8.0	46 24	59.1	A	8.9	40	21.0	B	9.2	29	1.8	
9.5	53	12.5		9.4	34	21.8		8.5	26	27.2	A	7.9	17 6	54.7	A	9.3	34	41.5	
8.4	52 1	18.6		9.4	17 0	43.4		8.2	44	48.9	A	8.7	13	0.5	B	9.3	36 12	30.4	
9.1	5	55.0	R	5.8	12	47.8	A	9.5	52	17.9		9.4	23	13.8	B	9.2	17	27.3	
8.6	15	11.1	R	9.2	19	57.5	B	8.8	47 11	25.7	A	9.5	25	37.6		9.5	58	7.6	
9.4	17	2.5		9.1	34	42.9	A	8.2	27	50.7	A	9.5	45	22.3		9.1	37 22	38.6	B
9.3	45	40.7		9.5	55	16.2	B	9.5	28	22.2		9.1	18 45	48.9	B	9.3	38 12	12.5	
9.0	53 52	39.8	R	9.4	18 3	3.9	B	9.4	34	4.0	B	8.0	49	24.1	A	9.3	39 3	5.2	
9.4	54 8	56.5	B	9.5	16	10.1		9.3	48 22	48.8	A	8.0	19 12	19.5	A	7.8	5	21.0	A
9.5	9	54.0		8.9	20 24	6.9		9.5	28	4.6		9.0	24	6.5	A	8.0	6	27.5	A
9.4	25	32.3		8.3	21 2	48.8	A	8.8	50 6	38.2	A	9.5	42	50.9		8.8	37	16.5	A
9.5	30	10.9		8.9	29	1.7		8.4	18	39.0	A	9.4	48	0.0	A	7.8	49	57.3	A
9.4	30	16.9		8.6	32	30.1		9.5	19	29.7		8.4	20 5	52.2		8.3	40 0	43.5	
9.5	50	31.2		9.1	22 18	55.1	A	7.2	37	13.3	F	9.5	42	45.4		9.4	19	31.2	B
9.5	54	39.9		8.9	23 3	41.4	A	7.9	52 23	51.8	B	7.7	48	5.1	A	8.6	24	50.9	J
8.8	55 41	45.3		8.2	17	6.4	R	9.5	42	58.4		9.4	21 2	54.7	B	8.8	28	19.5	
9.1	56 46	46.3	R	8.4	24 16	3.3		9.3	47	34.3		9.3	8	15.5		6.2	57	47.1	A
9.5	50	1.7		9.4	26	55.9		9.1	53 48	47.3	A	8.8	22 9	56.8		7.8	41 42	37.6	A
8.4	57 15	26.7		9.5	31	34.0	A	9.0	49	27.1	B	9.5	23 6	42.0		9.0	42 6	9.0	A
9.3	40	34.8	R	9.5	26 1	40.7		9.5	56	55.7		6.5	37	27.1	A	9.2	17	3.2	B
8.9	58 51	42.3	R	9.4	4	48.8		7.8	55 43	57.1	A	9.1	24 19	45.1		9.3	19	50.7	
8.0	59 7	59.1	R	9.0	5	20.1	A	8.0	56 39	17.7	F	9.3	20	9.2		9.4	22	11.5	A
9.1	9	1.0		9.2	15	21.2	A	9.3	57 17	22.3	B	6.5	24	28.5	A	8.5	43 38	22.7	A
8.5	11	52.6	R	9.4	21	35.3	B	9.5	23	32.7		8.8	52	21.9		9.2	44 0	49.3	B

2201—2260					2261—2320					2321—2380					2381—2440					2441—2500				
	21ᵘ—22ᵘ		+61°			22ᵘ		+61°			22ᵘ		+61°			22ᵘ—23ᵘ		+61°			23ᵘ		+61°	
m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	
9.2	21	44	14	51.8	8.8	22	5	9	11.9	A	9.5	22	32	2	42.3		9.0	22	55	23	18.1		9.1	23	17	14	41.5	B
9.5			17	46.3	9.5			29	48.8		9.0			27	25.0		8.9			36	19.0		9.5			46	47.0	
8.8		45	14	59.0	9.1			36	54.2		9.3			57	31.5		9.5		56	10	45.8		9.4		18	0	41.5	
9.2			19	35.5	B	9.4		6	50	18.4		9.5		33	34	4.4		8.0			16	44.0	B	5.3			27	28.6	A
9.5			37	9.4		9.1			54	49.4	A	9.5		34	5	57.8		7.8		57	30	51.7	B	9.5			40	4.7	
9.5			37	16.3		8.7		8	31	50.7	A	9.3			17	31.4		9.4		58	21	51.4		9.3		19	11	58.6	B
8.3			43	4.4	A	9.1		9	18	46.8	A	9.5			31	53.5		9.0			39	51.2	B	9.5			21	35.7	
8.0		46	30	7.0	A	8.9			34	11.9		8.3		35	30	17.7	A	8.0		59	29	34.7	A	9.4			25	27.4	
8.0		47	37	13.9	A	9.1			36	1.1		9.5			35	6.4		9.0			39	54.8		9.0			52	7.9	
9.1			53	26.0	B	8.8		10	40	35.0		9.5		36	52	26.2	B	9.5	23	0	34	8.7		9.0			20	0	57.8	
8.9		48	23	43.0	B	9.5		11	36	20.4		9.4			55	29.7		9.3			35	6.5		9.2			15	17.5	
9.4			25	29.7		7.1			36	35.7	B	9.5		37	2	6.8		9.0		1	7	51.5	A	9.3			15	2.4	
8.8		49	17	54.2	B	9.4			41	26.2		9.4			34	58.7		9.1			15	48.2	A	9.3			22	47.4	B
9.3			20	54.9	B	9.5			49	19.4		9.4			37	54.7	B	8.5			16	53.1	A	7.9		21	35	7.4	B
8.9			24	54.9	B	9.5			54	40.9	B	9.4		38	0	21.6		9.5			44	35.8		8.4		22	29	47.0	A
7.5			39	54.7	S	9.0			59	19.7	A	6.8			4	54.7	A	8.8			53	51.8		9.5			32	10.4	
8.6			46	53.1	G	9.0		13	1	23.7	A	9.5			46	22.5		8.8		2	10	47.7	A	9.1			38	9.4	B
9.2			52	56.4		9.5			5	41.9		8.0		39	9	26.0	A	9.5			51	36.2		9.4		23	7	40.1	
9.5		50	4	29.5	B	9.5		14	9	48.3		9.5			10	17.7		9.5		4	2	5.0		8.5			18	51.8	A
9.5			12	46.5		9.4			14	19.3	B	9.2			57	30.0	A	8.8		5	10	44.2		8.5			21	55.1	A
8.0			46	18.3	F	9.4			37	27.8	A	9.5		40	14	51.2		9.5			25	13.0		9.5			50	17.5	
9.1		51	53	52.5		9.5			44	7.1		9.5			22	32.5		9.5		6	40	13.0		8.2		24	15	29.6	A
9.1		52	11	34.4	B	9.5		15	33	23.1		9.0			35	56.8		8.8		7	27	51.8	A	9.2			19	31.3	A
8.4		53	14	2.5	A	9.1			47	35.9		9.1			36	50.9		9.4			45	13.0		9.5			27	0.1	
9.3		54	7	3.4	A	9.3		16	31	31.7		8.6			51	14.2	A	8.3			54	25.4	A	9.0			42	29.5	
8.9			18	46.6	A	9.1			40	28.1	A	9.5		41	48	37.8		8.8		8	14	50.5	A	8.0			43	18.0	A
9.5			33	43.2	A	8.0		17	2	31.3	A	9.5		42	3	33.4		9.4			38	39.7		9.5		25	18	31.8	
9.4		55	32	18.4	B	9.1			4	42.1	A	9.5			4	20.7		8.9		9	12	17.5		9.3			55	46.0	
9.4			41	38.9		9.5			17	46.0		9.5		43	2	55.5		8.3			18	5.0	A	8.8		26	0	28.4	A
9.5			43	35.4		9.5			43	1.4		9.0		44	8	34.8		9.0			43	57.8		9.5			8	3.5	
9.4			47	33.4	B	6.5		18	8	41.1	A	8.5			10	52.9		9.5			43	19.7		8.3			17	5.1	A
9.5		56	5	10.5		9.4			13	59.0		9.5			20	34.4		9.5		10	9	57.4		9.3			19	24.9	
7.0			19	46.8	A	9.3		20	54	2.9		8.8			38	10.7	A	6.5			16	9.7	A	9.3		27	13	15.5	
7.2			57	16.5	B	9.3		21	25	31.3		9.0		45	43	51.1	A	8.9			32	0.5	A	9.1			24	2.1	A
9.3		57	3	28.6		9.4			26	28.9		9.0		46	55	55.0	B	9.4			41	6.2		9.5			37	4.8	
9.5			12	27.1		9.4			47	37.7		8.0			55	40.4	A	9.5		11	14	59.4		9.3		28	11	37.8	
9.2		58	25	50.3		7.0		22	12	11.1	A	9.1			56	32.0		9.4			32	53.8		9.4			15	38.7	
9.5		59	3	54.1		8.2			20	58.9	A	9.1			57	53.5		9.5		12	2	0.2		9.2			25	41.0	
9.5			12	44.8		9.1			36	36.7		9.2		47	15	50.6		9.3			6	2.2	B	9.0			32	23.9	
8.9			36	24.5	B	9.1			43	39.6	A	9.3			26	54.9		9.5			20	51.4		9.4			42	22.0	
9.2			46	24.4	B	9.4		23	25	26.3		9.0			34	21.8	A	9.5			36	30.3		9.4			46	29.8	B
9.3			55	31.5		9.1		24	3	19.1	A	9.5			44	39.2		9.5			41	11.6		9.3		29	31	14.1	
8.7	22	0	2	42.3	B	8.1			8	1.3	B	8.5			50	22.3	A	7.2		13	11	56.1	F	9.4			35	18.5	
9.4			2	23.8		9.1			33	24.3	A	9.1		48	13	49.9	A	8.0			46	20.6	B	9.0			41	37.6	A
9.1			8	16.4		9.3			52	10.3	B	9.1			37	54.0	A	8.7			52	40.2	B	9.4			56	58.1	
6.0			42	34.6	A	9.2		25	30	21.3		9.3			58	50.6		7.3			52	49.5	B	9.1		30	19	30.8	
9.3		1	0	34.4	B	8.8			36	0.8		9.4		49	26	15.6		6.5			55	11.1	A	9.3			29	37.7	
9.0			4	33.3	A	9.5		26	8	17.7		9.4			27	0.4		6.0		14	16	25.2	B	9.3		31	27	9.7	
9.0			20	58.5	A	8.7			45	11.8	A	9.2			51	33.7	A	8.2			16	45.9	B	9.5			40	6.7	
9.1		2	30	40.0	A	9.5		27	22	44.2		8.0		50	3	32.2	A	7.6			31	37.1	B	6.5		32	2	19.6	A
9.0			41	20.2		9.4			25	36.3	B	7.5			19	40.2	A	9.2			31	20.8		9.4			14	52.2	
9.5		3	12	43.8		8.9			47	11.7	A	8.3		51	2	51.1	A	9.5			36	22.0		8.8			31	16.8	A
9.4			34	44.8		9.5		28	7	10.9		7.5			9	57.5	A	7.5			42	13.1	A	8.5			41	38.0	A
9.5			46	57.2		6.5			43	2.0	A	8.0			49	34.7	A	9.5		15	40	21.9		9.5			58	7.8	
9.3			50	20.4		9.5			44	50.3		9.0		52	5	23.3		8.5			48	45.0	A	9.1		33	19	14.4	
9.0			56	52.0		9.2		29	6	3.4		9.5			9	17.6		9.3		16	7	11.6		9.0			42	5.5	A
9.2		4	15	24.2		9.4			37	23.5		9.5			16	39.7		9.3			25	41.3		9.0		34	26	42.3	A
9.2			18	44.7	A	9.3		30	41	1.5		9.5		53	3	5.0		9.0			35	51.0		9.2			49	57.0	
9.2			34	47.7	A	9.2			44	21.2		9.3			14	54.0		8.4			35	49.5	A	9.4			53	9.0	
9.0			56	27.7		9.5		31	20	30.0		9.0			35	12.0		9.3			59	13.5		7.9		35	25	53.4	A

2501—2519				2520—2538				2539—2557				2558—2576				2577—2595			
	23u	+61°			23u	+61°			23u	+61°			23u	+61°			23u	+61°	
m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′	
9.4	23 35 50	14.7		9.3	23 39 13	51.8	B	9.1	23 43 27	16.1	A	9.2	23 46 28	36.4		9.5	23 51 23	55.2	
9.5	58	49.7		9.3	16	13.4		9.5	29	7.8		9.2	31	37.4		9.2	52 4	33.4	
9.3	36 0	1.9		8.8	48	47.3		9.5	43	38.1		9.5	48	33.5		9.5	53 3	55.2	
9.5	2	57.0		8.6	53	41.3	A	9.5	43	30.0		9.2	47 13	6.6	A	7.2	22	21.6	A
9.3	11	0.7		9.1	40 21	36.0		9.0	43	4.2	B	6.8	30	2.1	A	9.5	35	16.7	
8.9	22	47.4		9.5	40	7.1		9.0	44	44.1	A	9.4	36	14.5		8.0	54 18	12.3	A
9.3	47	13.0		8.5	41	14.4	A	9.5	54	7.7		9.5	38	20.0		8.9	56 2	34.4	
8.9	47	8.0	B	9.5	43	58.7		9.3	55	35.3		9.4	44	16.0	B	9.5	9	4.8	
8.5	53	21.4		8.9	41 6	9.5	A	8.8	44 6	48.1	A	9.5	48 26	1.4		8.5	38	24.9	B
8.9	37 8	55.1		8.6	26	11.4	A	9.4	19	29.0		9.4	49 7	18.1		5.6	47	28.9	G
8.9	44	7.2		9.4	28	28.8	R	9.5	43	48.7		9.4	26	23.0		9.4	57 35	16.2	
8.0	38 20	22.2	B	9.4	33	26.8	R	9.2	45 9	18.7		9.0	38	12.7	R	9.4	54	43.7	B
9.1	25	5.8	A	8.5	46	47.0		7.3	9	3.7	A	9.2	49	41.3		9.4	58 4	41.7	B
9.5	38	33.1		5.9	50	24.2	A	9.5	44	11.4		9.0	50	16.2	R	9.4	11	42.5	
9.5	45	28.3		9.3	42 1	2.1		9.0	50	50.5	A	9.5	50 15	54.0		9.5	55	30.1	
9.5	58	6.6		9.5	9	11.6		9.5	57	12.9		7.3	17	11.7	R	9.5	56	23.5	
8.8	59	45.6		9.4	15	9.5	A	9.5	57	9.2		9.0	39	25.4		9.3	59 19	34.0	
8.5	39 3	11.0	A	8.2	49	24.0	A	9.5	46 3	9.9		9.0	56	48.8		9.0	33	35.3	
7.7	3	51.9	B	9.0	43 24	22.0	A	9.2	27	44.4		9.4	51 19	43.6		9.5	51	54.0	

Zone +62°

1—20				21—40				41—60				61—80				81—100			
	0u	+62°			0u	+62°			0u	+62°			0u	+62°			0u	+62°	
m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′	
9.5	0 0 3	15.9		9.5	0 4 59	11.6		9.2	0 10 7	13.4		9.4	0 13 52	57.6		9.5	0 19 21	16.0	
9.4	5	20.0		9.0	5 9	31.9		9.4	10	5.5		9.5	57	42.5		9.5	57	25.0	
9.1	14	33.1	A	9.2	39	26.1		9.5	23	25.0		9.4	14 0	17.9		9.5	20 9	11.4	
9.0	29	32.3	A	9.4	40	33.8		9.5	24	32.1		9.5	15 1	37.9		9.0	11	56.2	
6.5	1 0	23.8	A	9.5	41	39.0		9.5	43	10.5		9.5	14	5.6		8.9	25	36.2	A
9.5	12	36.2		9.1	55	21.9		9.5	44	18.9		9.5	23	4.8		9.4	33	39.8	
9.5	43	14.5		9.4	6 16	56.4	R	9.5	57	58.9		9.0	38	31.6	R	8.8	56	42.2	A
9.2	2 18	49.5		9.4	53	35.9		7.5	11 5	29.0	A	9.4	42	33.9		8.8	21 3	40.5	
9.5	36	40.3		7.4	7 7	2.1	S	8.7	7	45.9	A	9.5	16 4	6.8		9.5	44	16.1	
9.5	48	32.4		9.5	18	44.7		9.4	11	51.7		9.0	21	6.2	R	9.5	51	15.1	
9.2	3 10	22.0	A	9.4	26	56.6	R	9.4	17	47.0		8.9	25	55.1		9.4	22 2	25.5	
8.6	19	36.1	A	9.5	33	19.7		9.5	12 3	38.3		9.5	40	27.6		8.8	15	52.7	
9.5	43	42.2		9.5	8 9	48.3		9.5	13	57.4		8.6	17 8	24.7		9.2	23 5	33.0	
9.4	42	25.2	A	9.5	19	17.4		9.5	28	10.9		9.5	56	20.8		9.5	8	32.4	
9.1	4 0	38.2	A	9.5	26	25.2		9.5	41	3.8		9.5	18 3	30.7		9.4	11	30.4	
9.1	0	6.8		9.5	42	41.0		9.5	41	47.2		9.5	5	37.2		9.4	12	32.4	
9.5	17	41.4		9.4	46	19.4		9.5	50	14.2		9.5	15	21.0		9.4	22	26.9	
9.5	18	25.7		8.2	9 10	45.0	R	8.6	13 2	52.0	A	9.1	24	47.6	R	9.5	56	21.0	
9.5	25	0.4	B	9.5	29	15.4		9.5	7	19.0		9.0	26	38.1		9.5	24 1	24.3	
8.0	42	5.5	A	8.5	33	0.9	A	9.5	23	15.8		9.5	30	25.0		9.5	8	19.3	

101—160				161—220				221—280				281—360				341—400			
	0h		+62°		0h—1h		+62°		1h		+62°		1h		+62°		1h—2h		+62°
m	h ′ ″		′	m	h ′ ″		′	m	h ′ ″		′	m	h ′ ″		′	m	h ′ ″		′
9.4	0 24	28	28.2	9.4	0 42	45	7.9	B	8.8	1 3	46	13.7	A	9.1	1 28	0	3.5		9.5	1 54	39	29.0	
4.5		48	7.8	A	9.5	43	55	40.9		9.0		54	15.7	A	9.1		1	10.0		9.5		43	22.5	
9.5		48	55.1		9.5	44	8	19.6		9.5	4	1	51.6		9.3		5	22.0		9.5		54	17.6	
9.2	25	17	58.6	A	9.0		59	37.9		7.7		2	3.6	A	8.3		43	58.6		8.0		55	15.4	B
8.9		38	19.5	A	9.5	45	18	23.5		9.3		43	49.1		8.6	29	7	43.2		8.3	55	25	28.8	A
9.4		39	24.8		9.5		18	45.7		9.4	5	14	3.2		9.4		53	20.1		9.5	56	2	3.9	
7.5	26	20	6.6	A	9.5		23	14.5		9.4		46	45.2		8.3	30	21	22.1		9.2		25	7.0	
9.5		51	11.0		9.5	46	18	2.3		9.5	6	48	15.9		9.5		25	3.9		9.5		48	45.8	
7.4		56	11.4	B	9.5		29	56.7		8.8		54	1.3	A	9.5		30	5.7		8.0	57	26	27.5	A
9.3	27	0	34.0		9.3		50	53.7	B	9.5	7	10	11.3		9.4	31	32	49.6		8.7		27	12.8	
9.4		10	37.3		9.4	47	19	32.4		9.4		15	46.2		9.5	32	2	0.1		8.9		37	7.6	
9.4		22	9.2		8.9	48	0	29.9	A	9.5		39	47.2		9.4		3	52.5		9.5	58	11	0.1	
9.3		25	20.0		9.5		11	29.9		9.4		57	47.2		9.5		17	49.1		9.5		15	23.0	
9.4		42	7.6	R	9.1	49	9	3.2	A	9.4	8	10	6.5		9.2		19	32.0		9.5		41	40.4	
9.0		58	1.2		7.7		31	55.7	B	8.2		56	46.5	G	8.6		23	40.8	A	9.5		53	7.6	
8.4	28	4	25.4		9.4	50	2	39.4		8.2	10	6	5.9	A	9.3	33	4	51.9		9.4	59	36	29.2	
9.0		4	39.2		9.4		19	12.3		9.5	11	46	32.5		9.2		18	51.9	A	8.5		54	53.9	A
8.8		9	37.0	R	9.0		48	49.8	A	9.4		56	32.2		8.5	34	38	13.7	A	9.4	2	0	20	58.3	
9.4		31	6.9		9.3	51	19	33.4		9.0	12	8	37.0	B	9.2		47	52.3		9.4		20	36.4	
9.4		52	1.7		9.4		29	47.7		9.4		11	59.4		9.4	35	2	7.6		9.5		1	2	10.7	
9.5	29	13	49.0		8.3		36	14.7	A	8.5		37	2.0		8.7		53	14.0	A	9.2		20	49.5	
8.8		39	32.8		9.4		55	39.3		9.3		51	17.7		9.5		55	5.6		9.1		23	42.9	
9.1		49	3.5		9.2	52	10	39.8	A	8.5	13	26	20.6		9.3		56	27.5		9.2		35	41.1	
9.5		59	1.2		9.4		25	39.8		9.5	14	23	9.8		9.5	36	49	21.2		9.0	2	50	3.5	
8.7	30	35	2.8	R	8.2		47	49.1	A	9.5		47	3.8		8.0		59	55.3	A	9.5	3	18	21.3	
9.2	31	2	8.8		9.3	53	31	12.7		8.8	15	2	1.8	B	8.0	37	40	51.1	A	9.3		40	36.5	A
8.8		3	15.6		9.2		32	37.9		9.1		23	45.9	A	9.5		56	50.1		9.5	4	28	13.2	
9.2		22	15.4		9.1		32	34.5	A	8.9		52	50.4	A	9.5	38	13	8.3		9.5		56	49.6	
8.7		24	37.0	A	9.4	54	7	23.5		9.5	16	29	17.2		9.5	40	53	21.5	B	7.0	5	6	33.4	A
7.5		29	25.6	A	9.5		13	19.6		9.5		38	49.2		9.5		59	52.3		8.8		25	56.6	
9.0		48	47.1		7.8		34	54.5	B	9.5		57	32.8		9.5	41	0	41.3		8.5	6	0	16.2	
9.4	32	24	47.7		9.4	55	50	0.0		9.5	17	5	7.2		9.5		4	19.2		8.3		3	42.2	A
9.5		48	9.3		9.4	56	5	47.2		8.4	18	8	0.1	A	9.3		30	43.7		8.4		12	38.3	A
9.4		49	54.4		8.0		15	56.9	B	8.0		23	31.0	A	9.4		52	44.7		8.0		26	29.5	A
9.5	33	56	32.9		8.5		35	4.9	A	9.5	19	20	35.4		9.5	42	52	34.4		8.7		46	29.7	A
9.4	34	1	36.3		9.5		45	59.6		9.5		50	32.9		9.5	43	14	40.8		9.5	8	3	35.9	
9.4	35	23	45.1		9.0	57	19	51.2		9.5		57	17.2		9.3		36	3.9		9.0	9	5	26.8	
9.5		40	52.0		9.5		35	11.3		9.0	20	19	50.4		9.5		38	38.8		9.1		31	16.6	
9.0		48	14.6		9.4		36	18.7		7.0	21	33	36.9	A	9.1		56	0.8	A	9.0		37	40.9	A
9.5	36	17	2.0		9.4		47	43.0		9.5		38	17.5		3.3	44	4	57.3	A	9.1		49	5.1	
9.5		29	27.0		8.1	58	16	43.5	B	9.5	22	7	57.5		9.3		26	59.0	B	9.2	10	20	38.0	A
9.4	37	10	8.2		9.4		20	44.0	B	8.2		28	51.4	G	8.2	45	6	56.7	A	9.5		34	41.1	
9.4	38	7	51.0	A	8.0		25	54.7	A	9.2		53	29.6		9.5		12	17.2		8.0	11	36	17.9	B
8.5		11	33.9		9.4		26	33.9		7.2		55	50.3	G	9.5		44	40.3		9.5	12	1	6.6	
8.7		14	7.8	A	9.5		27	24.5		9.4	23	1	17.7		8.5	46	37	17.2		7.4		10	56.3	A
9.5		24	33.4		9.5		59	47.7		9.4		33	34.4		9.4		59	29.5		8.8	13	8	21.3	A
8.2	39	7	58.6	A	9.3	59	10	48.7	B	9.4		39	13.8		9.5	47	1	4.6		7.4		15	52.9	A
9.5		8	43.2		9.3		20	12.3	A	9.4		44	10.8	B	9.3		18	21.6		7.3		18	23.2	A
9.0		28	33.4		8.5		32	55.0	A	9.5	24	32	15.7		9.5		45	19.2		9.0		31	1.9	A
9.5		59	43.1		9.5		38	10.8		9.5		34	9.3		8.8		58	55.7		8.9		41	13.6	A
9.4	40	3	50.6		9.5		46	12.8		8.2		54	52.7	G	9.5	48	57	2.4		9.4	14	6	30.6	
9.1		16	48.4	A	9.0	1	0	4	54.7		9.3	25	4	2.7		9.0	49	4	11.8	B	9.5		22	1.5	
8.5	41	13	0.9		9.5		56	46.2		9.5		5	49.8		9.2		7	54.2		9.5		39	53.1	
9.4		34	56.9		9.0	1	0	48.0	A	6.5		35	19.6	F	8.8		8	37.4		9.5	15	1	8.0	
8.7		37	22.5	A	9.5		32	5.9		9.3	26	6	53.5		9.4	50	21	37.4		9.5		23	23.9	
9.0		42	19.7	A	9.5	2	17	46.2	A	9.0		21	39.3		9.5		32	25.5		9.5	16	8	0.2	
9.5		48	57.2		9.4		25	29.0		7.2		52	39.3	G	9.5	51	20	30.5		9.5		22	13.5	
9.5		51	54.7		8.5		26	34.9	A	9.5	27	2	59.4		8.5		45	9.0		9.5		23	13.1	
8.0	42	26	19.6	A	8.9		37	58.6	A	9.5		21	58.9		9.5	52	40	11.9		7.5		48	13.9	
1.0		42	59.2	R	9.4	3	46	57.5		9.4		44	1.0		9.5	54	31	44.8		9.5	17	5	58.0	

401—460				461—520				521—580				581—640				641—700			
	2u		+62°		2u		+62°		2u—3u		+62°		3u		+62°		3u—4u		+62°
m	u ′ ″		′		m	u ′ ″		′	m	u ′ ″		′	m	u ′ ″		′	m	u ′ ″		′
9.5	2 17	17	52.9		9.4	2 35	12	23.4	9.0	2 57	45	26.5	8.1	3 22	46	1.9	B	9.4	3 49	30	44.2	
7.2		31	32.1	L	9.5		42	32.2	9.1		59	55.9	B	8.2		23	39	50.1	A	9.3		42	32.7	
9.5		32	22.2		9.5		44	51.0	9.5	58	14	4.3		9.4		24	50	23.5		7.5		50	14	0.8	A
8.5		40	27.0		9.1	36	56	20.5	9.5		54	14.5		8.5			56	28.1	A	9.3			18	29.9	
9.4		52	8.2		9.0		59	13.8	9.5	59	7	59.0		9.3			58	52.5		8.2			30	51.9	A
9.5	18	38	27.8		8.5	37	6	9.1	L	9.5		21	37.2		9.5		25	13	16.6		9.1		52	9	50.3	A
9.5	19	6	44.3		9.5		17	7.0		9.5		45	49.3		9.5			19	20.0		9.2			44	23.2	
9.5		18	14.6		8.1		18	40.2	A	9.0		48	37.0	B	9.5		26	50	27.6		9.2			48	48.1	
9.5		21	32.3		9.5		27	7.0		9.2		49	40.3	B	9.5		27	8	12.1		9.3			49	4.6	
9.5		25	12.6		9.5		31	51.9		9.1		50	34.8	B	8.5			10	40.3	R	9.0		53	31	28.0	
8.0	20	35	46.1	A	9.5	38	35	25.9		9.4	3	0	5	38.9		9.4		39	13.1		9.4			33	41.8	
9.5		39	37.5		8.1		58	56.2	A	9.4			39	30.4		9.5	28	37	46.3		9.0			42	39.7	
9.5		56	0.4		9.5	39	4	27.4		9.0			54	38.8		9.1		53	27.0		9.2		55	22	38.3	
9.5	21	38	36.6		9.4		9	5.4		9.1		1	15	44.2		9.2	29	17	13.7		9.5			36	27.5	
9.4		51	26.3		8.5		10	12.1		9.1			20	48.6	R	9.3		17	0.8		9.5			41	2.5	
9.5	23	11	25.2		8.3		15	46.8	A	9.5		3	53	18.9		6.6		23	10.4	B	9.0			46	26.5	B
9.5		27	14.4		9.5		37	6.1		9.3			59	33.3		5.0		36	45.5	A	9.0		56	8	6.7	
9.4		28	17.6		9.3	40	29	14.0		9.4		5	22	48.3		9.3		43	1.5	B	8.7		57	18	29.0	
9.2		52	56.5		6.7		40	48.7	B	8.8			29	41.3	B	9.1	30	7	27.0		9.1			50	10.6	
6.7	24	15	36.0	A	9.0		52	10.9		9.3			47	41.3	B	9.0	31	5	38.6	A	9.5		58	25	32.8	
7.4		23	59.9	R	9.3	41	6	8.5		9.4		6	56	20.4		9.1		29	6.9		9.3			55	6.8	
9.2		29	24.3		9.0	42	9	15.8	A	8.7			57	1.1	A	9.5	32	0	4.0		7.3			56	39.3	A
8.0		36	59.9	R	9.5		44	12.9		9.0		7	14	9.6		9.2		18	37.7		9.2		59	3	43.2	
8.5	25	5	18.6		9.3		51	18.6		8.8			15	49.6		5.3	33	24	53.1	A	9.2			27	12.2	B
7.5		13	29.2	A	9.0		54	16.4	A	9.5			22	6.5		9.3	34	1	37.5		9.5	4	0	50	24.8	
7.3		14	51.0	A	9.5	43	8	36.0		9.5		8	7	21.3		9.3		13	22.4		9.5		2	53	3.2	B
9.5		27	6.3		9.5		30	22.3		9.5			53	12.0		9.5		47	9.3		9.5		3	38	11.7	
9.5	26	41	17.5		9.3	44	15	53.1		9.4		9	26	47.2		7.8		50	0.5	A	9.5			50	46.2	
9.3	27	2	14.6		9.4		22	16.2	B	7.5		10	1	12.9	L	9.1	35	7	25.4		8.0		4	29	13.2	B
9.0		26	40.1		9.4		33	22.0		8.9			5	9.1		9.3		57	18.5		9.4			52	52.1	
9.5		49	55.1		9.3		46	46.2		7.8			16	11.5	L	9.5	36	43	28.7		9.5		5	20	17.2	
9.5	28	9	17.6		7.0		54	1.0	A	9.5			33	30.4		6.5		56	50.8	A	9.5			50	33.4	
9.5		15	18.6		9.5	45	45	28.8		9.5			36	0.1		9.4	37	22	37.2		8.3		8	30	18.4	A
9.2		17	14.8		9.0		47	10.2	A	9.3			42	1.9		9.5	38	9	10.1		9.3			38	26.5	B
9.5		21	40.0		9.5		57	12.8		9.5			54	5.0		8.3	39	21	14.9	A	9.5			49	36.7	
9.4		32	45.1		7.5	46	13	41.5	B	9.2		11	0	3.6	B	8.0		25	9.4	A	8.8		9	8	12.2	A
9.5	29	9	12.2		9.5		20	30.6	B	9.0			36	13.5		9.5	40	24	52.2		8.8			50	59.6	B
9.2		13	49.1	B	9.5	47	7	12.3		9.4		12	6	58.5		8.0		59	57.0	A	9.2		12	47	30.4	
9.2		24	13.5		9.5		12	43.6		9.5			9	57.0		8.2	41	30	52.7	A	9.4			53	23.2	
9.5	30	11	25.1		9.5		27	13.7		9.5		13	6	52.0		9.5		35	31.1		9.5		14	8	23.0	
9.1		29	1.8		9.5		48	6.9		8.3			17	25.1	L	9.5	42	37	27.0		9.5			9	8.8	
9.5		37	1.5		9.5	48	7	32.2	B	9.3			34	11.5		8.4	43	14	42.1		9.4		15	58	41.7	
8.8		39	22.9		9.4		40	37.2	B	9.1			39	19.6		8.2		21	47.5	A	7.9		16	53	22.4	A
8.5		56	32.8		8.0		49	8.0	L	9.5			51	53.5		9.5		41	26.8		8.5		18	27	12.9	A
8.5	31	0	47.6		9.3	49	6	27.8		9.2			57	28.1		8.8		45	36.8	R	8.7		19	44	13.4	A
8.6		17	7.5		8.4		33	45.4	R	7.5		14	19	40.3	L	9.4	44	2	2.9	B	9.2		20	51	22.4	
9.4		19	9.1		9.4	50	30	45.6		9.4		15	14	9.7	B	9.5		11	7.3		9.5		21	15	26.3	
8.7		29	3.0		9.2		32	26.3		9.5		16	2	5.9		5.2		40	38.4	A	8.8			15	55.0	B
9.5		34	4.5		9.4		42	10.6		9.5			7	57.5		8.0		59	20.7	B	9.5			52	58.7	B
9.0	32	38	26.5		9.5	51	33	33.5		9.2			35	6.1		9.5	45	27	23.1		7.5		23	10	34.5	A
9.5	33	2	51.6		9.0	53	7	26.0		9.5		17	37	38.5		9.5		32	17.6		9.4		24	18	31.3	
8.7		5	16.9		7.5		28	27.3	A	9.0			48	37.0	B	9.5		51	53.0		8.5			20	39.7	A
8.6		8	35.4		9.2		48	58.8		9.5		18	23	8.2		9.5	46	49	45.9		9.5			24	8.1	
9.5		10	18.6		9.4	54	6	52.5		8.4		20	2	2.4	A	9.5	47	7	15.5		9.5			54	55.9	A
9.5		43	54.9		9.1		10	25.1		9.0		21	19	56.6	B	9.0		26	20.4	A	8.0		26	9	55.4	A
9.4		49	8.5		8.3		40	14.2	A	9.4		22	2	40.3	B	9.5		32	30.9		9.2			21	54.4	A
9.2	34	14	10.1		9.4	55	9	42.1		9.5			6	45.2		9.3		50	10.7		9.2			56	37.8	A
9.5		17	51.2		8.0	56	4	3.7	A	9.3			8	29.9		9.2	48	23	42.5		9.3		27	1	49.9	A
9.0		25	27.4		9.5		47	59.1		8.5			19	9.8	A	8.4		31	13.1	A	8.8			31	7.8	B
8.2		28	6.8	L	9.4	57	45	55.4		9.5			43	30.4		7.9	49	17	5.9	A	9.2		28	42	21.7	A

701—760					761—820					821—880					881—940					941—1000				
	4ʰ—5ʰ		+62°			5ʰ		+62°			5ʰ—6ʰ		+62°			6ʰ—7ʰ		+62°			7ʰ—8ʰ		+62°	
m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′	
8.9	4	29 33	28.6	A	9.5	5	16 55	31.8		8.9	5	59 7	47.3	B	9.4	6	37 31	0.7		9.5	7	22 31	17.7	
7.7		32 21	57.9	A	7.5		18 7	51.9	A	9.3		22	43.1		8.6		47	23.8		9.1		23 0	2.0	A
9.4		35 2	44.3		9.5		21	3.7		9.2		46	14.1	A	9.0		38 54	57.8	A	9.2		16	48.7	B
8.9		10	23.1	A	9.0		19 44	6.2	A	8.7	6	0 1	16.2	A	9.3		39 57	26.8		9.5		18	29.5	
9.3		15	47.2	B	9.3		20 22	38.6	A	9.0		43	13.5	A	9.0		40 26	25.8		9.2		25 2	53.5	A
9.2		29	39.4	A	9.5		21 52	49.9		8.9		2 8	45.8	A	9.5		53	36.2		9.0		26	43.4	A
9.5		36 11	7.1		9.5		22 52	32.9		9.5		50	3.9		8.6		41 20	37.9	A	9.2		49	29.9	
9.5		37 15	10.0		9.5		23 2	42.3		9.4		3 33	8.7	B	8.7		42 11	22.2	A	9.5		27 7	25.1	
9.4		42	24.8		9.5		21	23.9		9.4		4 29	34.8		9.0		43 10	15.4	A	8.7		29 50	38.4	A
9.5		39 1	26.8		9.0		49	12.0		9.2		32	14.2	B	8.5		49	42.5	A	8.2		30 17	50.8	A
9.2		41 35	53.7	A	9.1		25 47	13.5		8.9		43	14.3	B	9.4		44 23	57.3	A	9.1		33	6.3	A
9.3		42 31	2.1		9.5		56	23.9		9.5		6 54	44.7		9.0		46 14	1.8		9.3		33 14	53.3	B
9.5		31	48.8		9.1		58	32.1		8.1		7 54	27.4	S	9.3		17	53.9	A	8.8		20	8.3	A
9.0		43 28	23.7	A	9.4		26 52	6.7		8.9		56	16.0		9.0		44	15.6		9.5		23	57.0	
9.5		56	11.9		8.1		27 58	31.5	A	7.3		8 52	9.5	B	9.2		47 31	23.4	A	9.5		34 6	15.8	
9.5		58	18.4		9.5		30 7	32.0		9.5		10 2	46.9		9.2		58	21.1	A	9.5		55	31.0	
8.9		44 22	34.4	A	9.2		19	43.3	B	9.5		41	26.9		9.5		49 9	5.3		9.5		38 15	55.8	
8.3		40	47.9	A	8.8		22	26.3	A	9.5		11 27	25.8		8.4		36	50.2	A	9.5		39 37	19.7	
9.0		48 5	48.3	R	8.0		24	17.0	A	9.5		12 0	20.9		9.5		51 31	44.8		8.2		41 35	31.3	A
9.3		49 28	25.2	A	9.2		32 8	11.5		7.3		27	45.7	A	9.5		58	36.4		7.5		42 40	24.1	A
9.0		58	47.4	A	9.5		42	9.1		9.5		14 13	54.0		9.0		52 10	7.7		9.4		43 2	16.2	
8.5		50 0	51.7	A	9.4		34 44	17.0		9.5		41	59.8		7.9		53 27	45.4	B	9.5		3	4.4	
8.5		0	52.2	A	9.0		35 19	52.5	A	7.8		42	47.7	A	9.3		28	31.1		9.4		17	7.5	
8.9		58	25.3	A	6.5		24	44.0	A	9.4		15 19	15.0		8.9		31	45.5	B	9.1		44 32	22.1	A
9.4		52 9	4.1	B	9.4		36 41	0.3		9.3		28	58.0	A	9.4		31	58.6		9.4		48 12	6.6	
9.5		53 29	25.8		8.8		37 31	19.5		9.5		40	18.9		8.7		54 12	20.5		9.5		32	4.5	
9.2		54 45	8.5	A	9.5		39	39.6		9.3		17 43	34.7		9.1		15	26.0		9.0		34	8.8	A
9.5		56	16.4		8.4		38 9	59.8	A	9.5		46	6.2		8.8		30	18.9		9.3		49 24	54.8	
9.2		55 0	5.0	B	9.4		21	40.0		9.0		56	48.5		8.6		46	32.8	F	9.0		50 16	24.6	A
7.0		56 18	17.4	A	9.4		31	42.5		8.8		18 0	58.4	A	7.6		56 51	21.4	F	8.1		22	1.5	A
9.4		53	28.4		9.5		40 27	40.2		9.5		15	41.8		9.5		57 4	29.5		9.5		28	35.4	B
9.3		58 55	38.0	A	9.5		41 31	14.5		9.3		33	57.1		8.4		35	5.0		9.1		40	5.4	A
9.1	5	0 2	9.1		9.4		42 30	4.6	B	7.3		37	50.6	A	7.8		59 7	29.5	B	9.1		51 22	42.3	
6.7		5	30.4	A	9.2		43 14	13.1	A	9.4		19 5	29.7		9.5		12	34.3		9.0		32	13.1	A
7.5		1 2	55.2	A	9.3		23	19.5		8.8		34	58.9	A	9.3		53	3.0	A	9.3		52 52	36.2	
8.8		11	21.9	A	9.5		45 34	57.1		9.5		20 2	3.8		7.8	7	1 38	23.1	A	8.9		57	56.7	A
9.5		2 47	34.1		9.5		46 24	48.3		9.5		24	6.9		9.5		5 11	12.8		9.5		54 13	28.7	
9.0		4 16	35.6		9.5		28	31.4		9.4		43	16.3	B	8.5		57	10.3	A	9.3		35	34.1	
9.5		22	28.5		9.5		30	26.8		9.5		50	52.1		9.2		6 35	52.4		9.0		37	53.8	A
9.5		5 54	51.5		9.4		47 28	7.8		9.2		21 31	26.4		8.8		7 57	48.3		9.5		56 28	26.7	
9.4		6 26	31.8		8.0		34	17.8	B	9.5		22 14	52.1		8.8		58	22.1		9.5		47	8.8	
6.0		51	29.5	B	9.0		48 40	27.7	B	8.8		18	3.2		9.3		11 12	29.3		9.5	8	1 48	10.8	
8.0		7 2	59.4	A	9.4		51	27.0		9.4		24 1	28.4	A	8.8		13 22	19.2		8.3		2 9	27.6	A
9.5		8 5	28.7		9.5		59	50.2		8.9		34	33.0	A	9.5		14 8	45.0		9.4		3 7	33.0	A
9.1		9 39	13.4	B	9.2		49 46	9.3		9.0		50	21.5	A	8.5		13	31.0	A	9.4		50	47.8	
9.4		47	14.6		9.5		51 44	19.6		9.4		25 4	44.7		8.0		15 18	9.8	A	9.2		4 10	39.9	A
9.5		10 56	30.2		9.5		52 18	29.4		7.2		27 10	3.6	A	9.4		16 0	45.9		9.2		11	41.7	A
8.5		11 54	17.5	A	9.2		36	5.3		9.3		41	52.6	A	8.8		17 23	38.5	A	9.1		46	17.6	
9.1		12 58	24.6	A	9.5		53 58	15.4		9.0		28 10	40.8	A	9.5		24	27.3		9.5		6 28	47.3	
9.5		13 16	22.8		9.5		54 18	13.2		9.0		30 7	55.0	A	9.5		58	2.5		9.5		35	39.4	
9.0		26	49.5	A	7.9		26	59.1	A	9.5		31 25	15.6		9.2		59	44.3	A	6.0		38		
9.5		14 12	35.6		8.4		28	50.2	A	9.5		28	13.6	B	9.3		18 12	36.2		8.6		8		
9.0		15 2	10.1	B	8.0		38	37.1	A	9.5		57	57.0		7.0		23	47.8	A	9.0		9		
9.3		38	11.9		9.5		55 49	25.8		7.8		32 13	46.2	A	7.0		19 1	3.0	G	9.4		10		
9.5		58	13.9		9.5		56 21	11.2		9.2		28	8.3	B	8.2		42	54.8	A	9.2				
8.5		16 7	33.4	A	9.0		46	32.4		9.3		33	19.0		9.3		20 45	28.3	A	7.8				
8.5		8	18.0		9.3		56	14.5	B	9.3		33 46	24.8		9.3		52	28.3	A	9.1				
8.8		18	42.6	A	8.5		57 21	20.2	A	8.8		35 14	16.0		8.5		54	16.8	A	8.6				
6.0		31	56.3	A	8.8		58 19	59.5	A	9.2		36 16	2.7	B	9.5		21 5	5.4	A	8.8				
9.2		38	55.7	B	9.5		32	14.1		9.5		42	17.5		9.5		22 30	13.3		8.8				

1001—1060					1061—1120					1121—1180					1181—1240					1241—1300				
	8h—9h			+62°		9h—10h			+62°		10h—11h			+62°		11h—12h			+62°		12h—13h			+62°
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′
9.3	8	16	51	55.7	9.0	9	5	15	14.9	8.6	10	12	23	7.7	9.3	11	19	9	44.9	9.5	12	28	3	20.9
9.2		17	18	45.3	9.4		6	34	41.4	9.0		13	10	20.7	9.3			13	8.7	9.3		29	14	20.8
9.5			23	40.4	9.3			40	51.3	9.5			33	10.9	6.4		20	46	34.0	9.4		30	17	19.5
9.4		18	24	27.3	7.6		7	58	11.5	9.0		14	13	51.1	9.5		22	17	28.8	9.5		32	35	41.1
9.3			56	28.1	9.0		8	55	8.1	9.5			20	26.4	9.5			24	39.1	neb		33	35	24.7
9.5		25	50	53.5	9.5		10	30	11.4	9.4			29	38.4	9.5			50	12.2	8.7		34	21	50.9
9.4		27	8	8.3	9.4		11	58	14.9	9.5			34	27.4	9.4		23	32	12.3	9.5			26	34.1
9.4		28	19	29.9	9.5		12	33	11.9	9.5		15	41	21.5	7.8		24	48	53.6	9.5		35	15	5.0
7.8		29	40	43.7	8.2			41	23.3	8.5		16	3	51.1	9.2		26	43	39.7	9.5			33	26.0
8.7			46	31.8	9.2		15	31	14.9	9.5			54	48.1	7.0		29	16	59.1	9.4			43	27.8
9.3		31	1	22.9	9.2			34	20.8	8.7		19	25	7.3	9.1			20	18.8	9.3		36	27	47.5
9.0		32	8	57.1	7.8		17	10	21.2	9.2		20	10	33.1	8.8		30	11	25.6	8.6		39	20	41.4
9.4			32	1.4	9.0		19	20	7.8	9.3			43	41.8	8.1			30	5.5	9.3			35	35.5
9.2		33	29	39.1	9.1		21	21	37.3	8.9		22	9	29.7	9.4		31	29	36.5	8.3		42	2	38.4
8.2		34	43	47.3	8.8			25	34.6	9.0		23	37	23.4	9.5		37	57	7.6	9.5			13	48.0
9.4		35	50	34.5	8.9			53	27.8	9.5		24	16	35.2	9.3		38	43	19.4	9.3			45	12.4
9.4			59	33.6	8.8		22	19	54.8	9.2		25	16	29.7	9.5			51	26.7	7.5			46	10.0
9.5		36	21	34.8	9.0		23	13	10.0	9.1		28	31	30.8	6.5		39	18	12.8	9.4		43	13	50.3
9.4			26	38.4	9.5			59	44.0	9.5		29	5	3.3	7.5		42	54	10.0	9.3			24	9.4
9.5		37	15	38.4	8.7		28	24	44.8	9.2			50	33.6	8.0			55	1.6	9.5		44	23	18.9
7.8		38	6	21.7	8.2		29	17	36.0	9.3		31	33	39.2	7.5		44	24	31.0	9.0		46	45	42.6
9.4			42	28.9	9.3		30	30	3.6	7.3		33	44	58.4	9.3		45	8	39.0	9.5		47	55	15.9
9.1		39	6	25.0	9.2		32	29	7.6	8.7		37	50	20.0	9.4		47	26	37.8	9.5			57	27.6
8.9			39	41.3	9.5		34	15	49.0	9.0		39	44	52.0	6.2		49	18	20.8	9.5		49	25	28.5
9.5		40	25	27.9	9.3		35	17	32.6	8.8		40	39	28.7	9.4			22	25.7	9.5		50	29	48.7
9.5			42	11.3	9.4			45	36.1	9.5		41	33	44.1	6.5		50	47	16.8	9.3		51	39	45.4
5.7		41	24	29.5	8.5		41	51	23.4	9.4			57	30.4	6.8		51	45	8.1	9.4			53	27.7
8.0		42	32	43.3	9.0		42	20	49.4	8.8		42	21	16.0	8.9			50	26.7	6.8		52	35	30.2
9.0		43	24	9.3	9.5			50	35.2	8.7		43	24	53.9	9.5		52	42	44.6	9.5		53	58	40.5
8.3		44	36	37.0	9.5		44	55	6.1	9.1		45	24	13.5	9.5		53	54	42.4	9.5		54	32	31.6
9.2		45	12	49.4	9.3		46	49	0.1	8.6			58	10.2	9.5		54	7	31.7	9.4			38	22.9
8.7			26	25.9	9.0		47	9	57.3	9.4		47	52	8.3	9.5		55	26	3.1	9.5		55	53	11.9
9.5		46	44	29.4	8.0			23	49.4	8.5		48	13	12.3	9.4		56	10	24.9	8.2		58	22	31.8
9.1			52	17.7	8.3		50	26	18.4	8.8			47	31.3	6.8			33	12.8	8.7		59	43	31.3
9.1		47	44	55.0	8.4			36	53.3	8.0		49	6	43.6	9.5		58	17	9.1	6.0	13	0	39	49.8
7.8		48	25	29.9	9.3		51	17	38.2	8.1			42	29.3	9.4			36	59.6	9.5		1	25	13.4
9.5		49	37	6.2	9.1			42	38.7	9.5		50	47	19.5	9.3	12	3	35	28.9	9.5		2	2	37.7
8.9			48	59.0	9.0		52	4	49.9	9.2		52	1	38.9	9.3		5	25	43.4	8.9		3	11	3.2
9.0		50	55	5.0	9.5		54	24	27.8	9.5		53	11	54.5	9.2			27	23.6	9.0			30	2.1
9.1		51	3	16.1	9.5			26	18.9	6.5		54	22	26.2	9.3			55	52.0	9.0		4	18	32.2
9.3			28	28.2	9.3			40	45.0	2.0			45	31.0	9.5		7	53	56.8	9.3		5	15	31.7
9.5			38	32.4	9.2		56	2	13.9	9.1		56	22	37.3	9.5			55	53.0	9.5		6	27	11.4
8.6		53	10	49.7	9.5			17	33.7	9.4		57	25	57.8	8.9		11	6	7.1	9.5		9	51	28.3
9.5			57	14.2	9.1			41	55.0	9.5	11	1	5	13.1	7.4		13	28	6.7	9.2		11	17	3.1
9.2		56	5	0.8	9.0			45	7.5	9.5		2	53	33.7	9.5			54	26.9	9.3			59	39.4
9.5			28	47.3	9.5		57	36	9.1	9.5		3	55	21.9	8.3		14	27	16.4	9.4		12	48	9.6
8.6			33	24.6	9.0		59	28	47.0	9.3		6	52	57.8	7.5			37	33.7	9.1		13	30	39.9
9.4		58	22	28.2	8.6	10	0	6	10.4	9.1		7	37	35.3	6.5		15	8	23.7	7.5		15	3	10.1
9.1			52	31.8	9.1			11	57.8	9.3			57	46.9	7.3			25	16.8	9.1			11	44.5
9.5		59	40	39.6	8.2			18	39.8	9.5		8	33	14.1	9.5			56	0.5	9.3		19	23	8.4
8.7	9	0	3	57.6	9.2		1	27	29.4	9.5		9	56	13.6	9.5		16	39	3.2	9.4			58	10.4
9.3			22	41.0	9.2		2	17	37.1	7.3		10	25	58.4	9.1			41	16.1	9.4		21	17	56.7
8.5		1	4	31.8	9.3		3	26	55.3	9.5		13	17	34.8	9.3		18	7	56.7	7.9			19	37.3
7.6			11	13.9	9.0			32	59.3	9.1			19	2.6	9.5			47	56.1	9.5		22	25	48.4
7.6			13	14.9	9.3			45	24.7	9.3			40	49.5	9.2		19	7	27.1	9.5			32	17.9
9.5			49	16.4	9.1		4	46	40.2	9.1		15	15	10.2	9.2			10	58.4	9.5		23	26	50.7
8.8			50	20.8	9.3		5	36	13.4	9.1		16	35	31.0	9.0			11	3.8	9.2			58	19.8
5.0		2	52	0.1	9.3		7	42	38.6	8.5		18	10	10.2	9.5		24	26	4.2	9.3		24	1	29.9
9.5		3	23	42.0	9.2		10	28	6.1	9.2			32	28.4	9.0		25	31	1.0	8.3			21	34.2
9.5			40	29.3	9.3		11	1	34.7	8.4			48	54.6	9.5			33	16.4	9.5			25	0.1

1301—1360					1361—1420					1421—1480					1481—1540					1541—1600				
	13ᵘ—14ᵘ		+62°			14ᵘ—15ᵘ		+62°			15ᵘ—16ᵘ		+62°			16ᵘ—17ᵘ		+62°			17ᵘ—18ᵘ		+62°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
8.3	13	24 34	0.1	B	9.5	14	35 47	34.0		8.5	15	37 29	0.7	A	8.9	16	22 58	11.8	B	9.5	17	18 38	6.3	
9.5		25 36	28.2		9.5		49	19.1		7.6		38 7	20.5	A	9.5		25 8	36.9		9.0		41	15.1	A
9.5		29 24	1.0		9.3		37 20	56.1	A	9.3		13	49.2		8.0		26 6	38.7	A	8.9		20 22	49.7	A
9.5		32 37	16.2		8.8		55	47.2	B	9.2		14	25.3	A	9.3		11	53.0	B	9.4		21 4	25.9	A
9.5		38	32.0		9.5		38 52	2.1		9.1		39 42	31.2	A	9.0		49	52.1	A	9.5		31	18.1	
9.5		34 15	37.3		9.5		39 54	46.3		9.3		44	47.2	A	9.1		27 39	14.4		9.0		22 22	51.7	A
9.3		45	41.2	A	9.1		44 9	46.5		9.4		40 55	40.2		9.5		54	24.2		9.5		23 9	34.0	
8.5		35 1	46.1	A	8.2		15	10.1	B	9.5		41 53	33.9		8.8		29 45	38.8	A	9.3		24 59	37.8	
9.4		47	42.2		8.8		46 21	38.4	B	9.5		43 56	13.2		9.3		31 54	1.6	A	9.0		25 0	8.3	
9.5		36 19	19.6		8.9		22	25.6	B	9.5		44 27	46.9		9.5		33 31	56.0		9.0		0	29.3	B
9.3		37 56	43.2		9.0		48 16	52.6	B	8.0		46 18	47.6	A	9.4		50	8.4	B	9.4		27 41	29.8	
9.5		38 32	31.8		9.5		17	40.1		9.5		31	22.1		8.6		34 15	40.5	B	9.1		28 20	0.4	
9.5		39 6	1.9		9.5		49 15	16.3		9.3		48 24	33.2	A	9.5		35 10	15.4		9.5		34	11.6	
9.3		47	8.8		9.1		50 26	15.8	B	9.5		49 35	20.2		9.5		12	9.5		9.3		58	53.5	B
9.3		41 41	2.4		8.3		51 4	44.5	B	9.1		50 23	45.8	A	9.3		36 5	2.1		9.3		29 22	39.4	
9.5		42 13	59.4		9.4		52 51	9.0		9.5		51 25	8.3		9.4		10	37.4		9.0		30 51	2.3	
9.5		43 33	58.9		9.5		54 35	51.3		9.2		53 2	38.4		9.0		11	51.0	A	8.5		32 23	48.5	
6.0		45 1	12.2	A	9.5		39	58.8		9.3		10	12.0	B	9.5		37 57	52.0		8.7		49	27.3	B
8.6		24	38.5	A	9.4		55 13	33.4		8.9		14	35.2	A	8.5		59	36.1	A	7.5		33 59	32.5	G
8.8		49 25	54.5		6.8		29	14.6	A	9.5		55 6	31.8		9.4		38 43	40.3		9.5		35 3	31.1	
9.5		34	38.2		9.5		48	46.1		9.5		56 6	42.8		7.2		39 29	34.7	A	7.7		36 17	1.8	A
8.4		47	48.7	B	9.0		56 43	50.5	A	9.4		23	30.2		8.8		40 24	31.7	A	9.5		51	29.3	A
9.5		50 37	4.4		9.0		59 19	2.7	B	9.4		28	53.4	A	8.9		42 42	25.0	A	9.5		37 16	12.5	A
9.5		53	54.5		9.5	15	3 33	2.5		9.3		57 56	1.4	A	9.1		43 18	56.1		9.5		38 7	18.5	A
6.7		53 1	11.6	A	8.5		45	22.5	A	7.6		58 30	29.2	A	9.2		45 7	7.9		9.5		13	6.3	
9.5		55 39	35.8		9.2		53	18.0		9.2		31	3.3	A	9.5		25	53.7		9.5		40 44	27.7	
7.1		58 24	23.1	A	9.5		5 40	31.5	B	8.8		37	21.5	A	9.5		29	47.3		9.0		41 24	14.1	
8.0		33	58.9	A	8.6		58	17.7	B	9.5		59 26	44.1		9.5		46 38	18.2		9.5		59	18.8	
9.5		45	14.8	B	9.5		6 20	26.6		9.4	16	1 26	53.3		8.8		48	32.9	A	9.2		42 3	49.3	
9.5		59 15	9.2		9.3		8 7	24.1	B	8.1		27	7.1	B	9.2		49	12.6	B	9.1		47 17	15.3	A
8.6		16	18.1	A	9.2		23	7.8		9.5		29	8.8		8.2		47 9	40.4	A	9.5		17	8.4	
9.4		25	42.7		9.5		36	44.5		7.7		3 16	42.5	A	8.8		37	27.3	A	9.5		47	17.3	
9.4		49	42.2		7.5		59	23.2	A	9.0		53	49.0		9.5		37	10.2		6.3		58	49.1	A
9.1	14	0 38	10.8		8.8		9 59	43.0	A	8.0		4 1	0.8	B	9.5		48 37	47.9		9.4		48 0	26.7	
9.5		3 52	37.1		9.3		10 3	17.3		9.4		39	22.3		9.5		49 31	18.6		7.9		49	49.5	A
8.8		6 2	8.2	A	9.5		11 49	52.8		8.5		5 32	39.3	A	8.8		50 41	58.6	A	8.3		49 42	21.5	
9.2		8 19	48.4	A	9.5		12 50	32.7		9.4		45	46.2		9.5		51 58	56.9	A	8.7		51 18	20.7	
9.3		20	45.9	B	9.3		13 43	21.8		9.3		6 1	1.1		9.5		52 19	41.3		9.4		46	49.6	
8.8		9 28	24.9		9.5		14 5	29.8		8.3		9	37.1	A	9.5		45	29.0	B	9.4		52 38	29.4	
9.1		10 33	3.9		9.5		18	45.0		8.5		33	24.9	A	7.2		53 21	20.1	G	9.5		40	2.5	
9.5		13 19	17.7		9.1		19	24.8	A	7.5		41	51.6	A	7.0		54 52	35.5	G	9.2		53 51	42.7	A
8.2		14 38	38.0	A	9.5		44	59.8		9.3		7 52	46.3	A	9.5		55 59	9.7		8.8		57	19.7	
9.1		17 4	12.1	A	8.5		15 38	40.1	G	9.5		10 25	45.3		9.3		56 49	7.8		9.0		54 30	52.9	A
9.0		12	18.6	A	9.0		16 4	54.3	A	9.4		11 11	31.8		9.0		57 13	44.9		9.4		40	33.8	
8.7		18 4	56.1	A	8.0		45	39.6	A	9.1		14 7	49.6		9.5	17	1 20	31.5		9.4		54	13.8	
9.0		49	0.2	A	7.2		17 15	59.6	A	9.4		11	28.4		9.2		43	37.8	A	7.0		55 11	37.3	A
8.2		19 25	2.8	A	9.3		34	46.1		9.5		15 30	23.7		8.3		2 30	24.0	A	7.2		15	38.3	A
8.5		46	8.3	A	9.1		18 53	26.8		9.5		32	31.6		8.0		3 7	22.0	A	9.1		30	21.2	A
8.2		52	36.0	B	8.6		19 12	3.4		9.1		34	52.1		8.9		6 1	39.7	A	8.5		56 14	9.9	A
9.2		21 22	23.6		6.0		55	32.7	A	7.3		16 18	45.3		9.3		7 14	6.8		8.5		39	24.1	A
9.5		25 21	18.6		7.5		20 42	6.9	G	9.5		17 16	45.2		9.4		9 39	32.8		9.[illegible]			[illegible]6	
8.9		28 52	4.3	B	9.5		22 41	35.7		9.3		24	52.7	B	9.0		10 [illegible]	9.7	A	[illegible]			[illegible]	
9.4		29 8	38.9	B	9.5		24 44	19.3		9.5		18 36	40.3		8.8		11 16	0.4	A	[illegible]				
9.5		30 42	28.9		6.7		25 6	45.6	A	9.3		19 35	13.9		9.2		13 43	21.3	A					
9.5		32 55	25.8		6.5		58	13.7	A	8.5		37	24.3		9.5		14 38	31.0						
9.5		33 1	10.2		6.1		26 49	36.3	A	8.5		20 56	1.1	A	9.5		53	5.8						
8.3		34 45	16.6	B	9.5		30 39	22.5		8.8		21 32	49.1		8.0		15 47	43.4						
9.0		45	18.5		9.3		59	31.7		6.5		52	1.6	A	8.4		50	46.8						
9.5		35 35	47.3		9.5		32 40	27.6		9.5		22 27	28.5		7.5		17 35	42.[illegible]						
9.4		47	15.1		9.4		36 39	32.4		8.5		56	55.1	A	8.1		18 22	46.						

1601—1660				1661—1720				1721—1780				1781—1840				1841—1900			
	18ᵘ		+62°		18ᵘ—19ᵘ		+62°		19ᵘ		+62°		19ᵘ—20ᵘ		+62°		20ᵘ—21ᵘ		+62°
m	ᵘ ′ ″		′	m	ᵘ ′ ″		′	m	ᵘ ′ ″		′	m	ᵘ ′ ″		′	m	ᵘ ′ ″		′
9.5	18 10	23	28.9	9.2	18 53	30	50.2	B	8.0	19 27	26	53.3	A	9.2	19 59	3	7.7	B	9.0	20 35	15	34.3	
9.3		54	59.9	9.5		51	6.5		8.0		52	15.3	A	9.1		39	14.6	R	8.8		57	30.7	
9.4	11	53	16.0	B	8.0	54	15	53.6	A	9.5	28	16	41.5		8.6	20 0	31	0.6	R	9.5	36	40	29.1	
9.5		54	30.8		8.0		28	13.5	A	9.3	29	2	23.5		9.3	1	8	48.0	B	8.7	37	0	52.6	A
9.0	12	4	5.9	A	9.3		28	42.5		8.0	30	24	48.9	A	8.8	2	0	30.0	A	9.5		10	20.2	
8.6		7	10.8	A	9.5	55	17	14.1		9.5		31	49.1		8.8		33	34.0	A	9.3		58	22.7	A
9.0	14	18	19.9		9.5		30	41.2		9.5		46	12.1		9.1		57	42.7	A	8.0	38	15	17.7	A
9.0	15	28	43.6		9.5		32	44.2	B	8.5	31	15	46.9	A	9.5	3	22	57.5		8.8	39	26	5.0	
9.5	16	57	23.1		6.1		52	12.0	A	9.4	32	3	38.0		9.1	4	5	15.8	R	9.4		40	29.9	B
9.5	17	16	16.8		8.0	57	19	37.4	B	7.5		6	16.6	F	8.5		8	18.8	R	8.0		47	49.7	B
9.1	18	23	43.7		8.0	58	15	48.6	B	9.1		29	27.7		8.2		11	39.8	A	9.0		56	41.7	A
9.0	19	45	53.5		8.8		39	32.9		8.6		29	31.2		9.3	7	30	31.0	R	7.7	40	5	41.1	A
8.2	20	2	21.2		9.5	59	10	4.3		9.0		38	51.5	B	9.0	8	20	16.3	R	9.3		22	40.0	
9.4		18	17.3		6.7	19 1	9	29.4	A	7.5	33	27	20.9	F	9.5		55	19.2		7.8		47	41.2	A
9.3	22	9	53.0		9.1		43	26.8		9.1		32	51.7	B	9.4	10	27	15.3		9.3		48	50.4	
7.8		14	41.7	L	9.3		43	59.2		9.1		41	8.3		8.5	11	42	44.2	A	9.2	41	54	6.0	B
8.9		25	22.8	A	9.5	3	4	31.1		9.5		42	2.8		9.1	13	38	17.2		9.5	43	3	17.3	
9.5		27	2.5	A	9.5		12	35.2		8.7		45	37.0	B	9.5		50	1.9	B	9.0		49	5.5	A
9.4	23	51	28.0	A	9.5	4	53	19.1		9.2	34	1	53.8	B	9.1	14	1	15.8		8.7	44	6	51.0	A
9.0	24	11	44.2	A	9.5	5	10	32.2		8.6		6	42.5		9.5	16	6	15.3		9.5	45	28	17.3	
9.1		17	50.5	A	9.5		10	25.4	B	8.9		43	1.3		9.5		16	34.9		9.0	46	17	39.3	A
9.5		41	33.0	A	9.3	6	34	14.6		9.2	35	2	29.5		9.4		22	30.3		8.2		38	48.1	A
9.3		42	50.0	A	9.2		36	57.2		9.5		56	23.7		9.1	17	46	8.9	A	9.5		47	23.6	
9.1	26	15	32.9	A	9.3	7	45	28.0		9.5	37	19	29.4		9.1		54	44.7	A	9.5	47	10	40.7	
9.5		28	18.3		9.5	8	25	29.2		9.5	38	18	9.7		9.5	18	50	47.7		9.5	49	24	12.8	
9.2	27	48	10.3	A	8.6		39	13.1	B	8.8		46	7.4		9.1	19	2	51.6	A	9.5		40	36.5	
9.3	28	4	11.5	A	8.5		45	17.3	B	7.5		48	19.1	S	6.8		7	58.5	A	9.0	50	7	11.4	A
9.4		26	9.4	A	8.6		50	22.4	B	8.6	39	13	2.0		9.5		40	31.5		9.1		16	1.5	A
7.0	30	3	25.6	A	9.4	9	2	35.0		9.0		25	28.5		9.4	20	36	7.4		9.5	51	23	16.4	B
9.5	32	13	8.9		8.8		30	8.8		8.4	41	33	26.0		9.4	21	5	56.8	B	9.3	52	45	10.9	
8.5		28	19.2	A	7.7	10	0	57.2	F	9.0	42	26	23.8		9.5	22	37	22.2		8.3		49	24.1	A
9.4	33	2	54.7		9.4		1	6.2	B	9.5	43	4	44.2		9.5	23	16	59.5	B	9.0	53	7	31.2	
9.5	34	45	58.2		9.4		14	24.5		8.2		20	0.6	B	8.9		31	24.1		8.8		35	2.0	A
8.7		55	2.5	A	9.2		37	20.1		8.2	44	12	9.2	F	9.5	24	11	59.0		9.0		48	3.0	A
9.0		58	56.2		9.5	11	49	57.0	B	9.1		16	7.4		9.4		15	1.0	R	9.4		53	21.9	B
9.2	35	26	4.4	A	9.5		55	56.8		8.7	45	1	16.7		9.4	25	13	35.8	B	8.8		54	27.7	R
5.7	36	16	23.7	A	9.3	12	27	5.8		9.5	46	12	25.0		9.3		20	9.2		9.3		56	9.0	
9.5		37	26.0		7.7		38	32.1	A	9.2	47	29	8.9		9.2	26	5	0.5	A	8.0	54	26	17.3	A
9.3	37	56	32.2		9.4		46	14.8	B	6.7		39	50.2	F	9.2		6	1.0	A	9.5		53	36.6	
9.4	38	39	52.8		8.8	14	18	27.0		8.2		49	11.4	B	9.3	27	7	4.7	B	9.4	55	22	44.2	A
6.3	39	44	37.4	G	9.4	15	15	50.3		9.4		52	17.7	B	4.0		9	31.0	G	9.1		58	7.0	A
9.3		53	40.0		6.5		31	56.7	A	8.5		58	22.2		9.1		37	20.7		9.1	56	38	2.0	
9.5	40	25	49.1	B	9.3		44	6.6	B	9.5	48	27	2.8	B	8.5	28	29	46.0		9.2	57	42	3.9	A
8.5		39	49.0	B	8.2	20	14	31.3	B	9.1	49	53	7.4		9.0	29	4	47.2		9.5	58	21	29.7	
8.2	42	55	50.2	B	8.0		23	48.9	A	8.4	51	11	10.1	G	9.4		6	30.4		8.8	59	30	35.5	R
9.3	43	10	41.5		9.4		33	34.1	B	9.4		32	40.3		8.5		31	0.6	A	9.4	21 0	5	12.9	B
9.0	44	57	37.5		9.5		35	31.3		8.8		44	49.2		9.4		37	35.0		9.5		23	12.2	
9.5	45	52	46.9		8.0	21	26	19.4	B	7.5	53	11	11.8	A	9.4	30	21	21.2		9.5		54	32.8	
9.5	46	0	44.5		9.5	22	0	16.1		8.5		14	56.7		9.5	31	0	30.6		6.5		1	6	47.8	R
8.4		31	47.7	B	9.4		5	32.0		9.3		34	17.2		9.5		15	57.4	B	8.8		2	23	48.6	
9.3		33	7.9		9.3		19	8.8		9.4	54	2	1.5		9.5		45	57.7		8.8		33	55.4	
9.2	47	15	59.2		8.8	23	29	4.8		9.3		53	8.0		8.9	32	33	58.8	R	6.8		56	19.9	A
9.5		59	25.2		8.3	24	16	0.9	A	7.2	55	18	29.1	A	9.0	33	10	58.4	R	9.5	3	38	1.6	
9.5	48	55	41.5		9.5		23	36.5		8.5		55	34.0	A	9.5		31	16.8		9.5		48	27.4	
8.6	50	4	28.6	A	9.4		30	31.7	B	9.0	56	36	45.2	A	9.4		40	32.9		8.5	4	8	19.4	A
8.8		34	12.2	A	6.6		50	16.1	A	8.3	57	1	39.6	A	9.3		51	29.2	B	8.0		28	28.4	A
8.4		44	9.4	A	9.3	25	4	12.6		8.7		8	26.7	A	9.1	34	32	53.6		9.2		57	3.1	
8.7	51	18	43.9	B	9.1		12	7.8		9.5		29	44.7		9.3		45	50.6		8.8	5	4	11.4	R
9.5		20	44.3		8.3	26	13	43.4	A	9.5	58	52	22.2		8.9		47	19.8	B	9.3		40	39.2	
9.5	53	4	2.5		9.5	27	10	30.9		9.5		59	59.5		8.6	35	0	11.3	A	8.0		51	19.3	A

1901—1960					1961—2020					2021—2080					2081—2140					2141—2200				
	21h		+62°			21h		+62°			21h—22h		+62°			22h		+62°			22h—23h		+62°	
m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′	
8.9	21	5 55	23.5	B	9.0	21	35 23	23.5	A	9.5	21	58 11	14.7		8.4	22	22 2	59.7		9.5	22	51 44	29.3	
9.2		56	18.1		9.3		36 31	24.2	A	8.8		59 12	52.5	B	9.4		3	2.6		8.8		52 26	34.8	A
7.0		6 24	41.7	A	8.9		52	28.4	A	8.7		14	49.2	A	9.2		7	29.8	B	9.5		33	36.1	
9.2		33	31.1	B	8.9		37 7	17.9	A	9.3		20	34.6	B	8.2		37	31.3	A	9.5		54	30.1	
8.0		33	10.1	A	9.5		11	10.5		9.1		21	48.4	A	9.5		56	12.7		9.4		59	34.1	B
8.9		49	28.9	A	8.8		28	14.4	A	9.5		23	37.6		9.1		57	15.2	A	6.8		59	55.8	A
9.5		7 5	29.1		9.5		38 6	12.2		8.9		29	56.2	A	8.2		24 9	32.0	A	7.7		53 1	18.5	A
9.4		13	8.1		9.3		11	40.8	A	5.9		36	23.6	A	9.2		17	2.9		9.5		3	22.8	
9.3		14	6.6	A	8.3		35	40.7	A	6.0	22	0 37	3.4	A	9.4		26	29.9	A	9.5		24	48.7	B
9.5		22	45.1		9.5		43	17.8		9.0		47	22.4	A	9.5		25 51	1.0		9.2		33	3.9	
9.5		43	40.2		9.0		39 3	30.1		9.5		54	0.5	A	8.6		26 18	46.2	A	9.1		36	1.3	
9.5		9 11	14.4	R	9.3		44	35.0		8.0		58	53.2	A	9.5		47	7.4		8.8		57	0.0	A
9.5		26	19.4		8.2		50	6.4	B	9.5		2 27	53.4		8.8		59	26.0		9.4		54 9	55.8	
9.5		34	29.8		9.3		40 5	2.0		9.3		47	55.7	B	9.1		27 35	39.3		9.2		50	44.7	A
8.7		10 18	17.1	A	8.0		6	56.5	A	9.5		48	10.3		9.5		36	55.9		9.4		55 5	6.9	
8.8		11 47	13.4	A	8.0		21	4.4	A	9.4		51	12.5		9.5		44	14.4		8.2		26	10.5	A
9.3		12 12	23.1	R	9.0		45	7.1	A	9.0		3 7	58.4		9.5		29 16	57.5		7.5		48	30.3	A
9.5		39	16.9		9.0		49	36.0	A	9.3		57	48.9		9.5		47	22.0		9.4		56 22	1.9	
9.3		13 40	41.7	R	9.5		42 51	6.4		8.0		59	1.3	B	9.5		31 43	23.4		9.5		34	15.0	
9.5		14 5	10.5		9.5		44 2	38.0		9.3		4 24	16.3		8.2		52	59.5	A	7.0		53	32.8	A
8.7		9	18.9	A	9.5		17	22.3		9.5		5 13	20.0		9.5		56	17.6		7.8		57 17	55.5	A
9.3		34	35.6		9.5		45 24	41.5		8.9		6 1	50.1		5.3		33 31	49.7	A	8.3		33	46.7	A
8.9		44	30.7	R	9.2		52	44.5		9.5		17	57.3		9.1		43	55.9	A	7.8		58 14	37.2	A
9.1		15 12	56.3		9.5		46 6	38.0		9.0		30	34.2	J	8.2		34 48	49.0	A	9.5		41	12.0	
9.5		19	17.4		9.2		22	4.4		8.0		31	41.6	J	9.2		35 54	21.5	B	6.5		43	26.9	A
9.0		16 18	5.9	B	8.9		42	5.9		9.2		7 22	59.9		9.5		36 13	17.0		8.8		55	34.2	A
8.5		17 11	1.6	A	9.5		48	33.5		7.7		35	46.1	J	9.3		49	49.4		8.5		59 24	36.7	
9.5		18 20	52.9	B	9.3		47 50	14.2		6.5		51	33.2	A	9.2		37 14	49.4		9.5		33	6.5	
9.5		21	21.8	R	9.1		53	9.4		9.1		8 19	17.9	A	9.5		41	11.2		8.5		33	56.2	
8.8		24	31.7	R	9.5		56	21.8	B	9.4		33	30.8		9.2		39 58	46.4		7.3	23	0 18	25.8	A
9.5		55	39.2		9.3		48 13	31.0		9.4		33	0.2		9.2		40 20	26.5		6.2		1 55	50.7	G
9.5		19 19	12.9		7.6		19	24.9	S	9.5		55	57.9		9.5		41 17	44.7		9.5		2 48	28.4	
9.0		53	38.4		9.5		22	22.1	B	7.0		9 16	26.3	A	9.2		42 27	37.4		7.0		3 0	2.1	A
9.5		20 24	1.1		7.0		27	0.1	G	9.5		41	10.6		9.3		34	6.0		6.6		2	8.3	A
7.3		54	22.5	A	9.5		31	19.4		9.0		50	22.8	A	6.0		43 17	10.2	A	9.5		17	35.6	
9.3		55	56.1		9.4		32	32.0		7.5		11 59	59.3	A	8.9		28	23.0		9.2		18	8.6	
9.5		21 22	54.8		9.2		47	31.1		9.5		12 36	14.3	B	8.5		52	57.1	B	9.5		32	32.1	
9.5		43	15.9		9.1		54	28.0		9.5		13 20	17.0		9.1		44 7	9.3		9.3		36	15.6	
9.3		22 0	7.1		8.8		49 5	34.5		6.0		30	3.9	A	9.4		47	42.2		8.1		36	56.2	A
8.5		14	45.6		9.5		18	40.0		8.5		45	29.8	A	9.5		45 23	49.1		9.5		56	43.6	
9.5		45	58.4		9.5		22	31.8		8.4		48	29.8	A	6.5		59	11.9	A	9.5		57	51.5	
7.0		23 29	56.6	A	9.3		51 31	9.4	B	9.4		56	1.0		9.5		46 27	37.5		9.5		4 45	27.3	
9.5		30	44.1		9.5		39	25.1		9.5		57	57.4		9.3		30	1.4		9.2		53	53.5	
8.0		41	26.8	A	7.2		47	34.4	B	9.0		14 12	30.3	B	9.3		47 19	25.8		9.3		55	22.4	
9.3		49	27.1		9.5		52 2	43.5		9.2		22	35.9		8.8		19	39.3		9.2		56	3.6	
8.5		24 25	43.6		8.5		5	12.4	B	9.5		32	31.0		9.3		59	40.2		9.5		5 9	36.3	
9.5		32	50.1		5.7		33	55.8	G	9.1		16 17	37.4	B	9.5		48 16	38.7		9.5		33	54.9	
9.5		25 55	20.4		9.5		47	0.1		8.1		23	28.8	A	9.5		26	32.8		9.4		42	28.9	
9.5		26 22	45.1		9.3		53 10	33.8		9.1		30	45.9		9.5		52	49.3		9.5		53	44.1	
9.2		23	52.7	B	7.0		54 38	0.1	A	7.5		17 6	24.5	A	8.9		49 43	23.2				6 1	12.6	A
9.5		30	7.1		9.5		52	13.2		9.2		45	50.6		9.3		52	31				4	10.8	
9.5		28 12	17.4		8.8		53	34.2		9.4		18 33	9.5		9.4		50 1	34				19	20.6	A
8.8		29 1	27.1		8.8		57	3.8	A	8.6		49	23.0	A	9.5		15					30	11.4	A
9.1		5	24.4		8.7		55 31	33.8		7.5		19 54	50.2	F	8.6		17	4					29.2	B
9.0		20	5.3	B	9.5		56 25	14.7		9.5		58	11.1		9.5		17						21.8	
9.3		54	45.1		8.9		32	7.9	A	9.4		20 22	24.5		7.5		54						51.2	
8.6		31 36	10.9		9.2		54	56.8	B	9.4		35	7.6		9.0		55						20.6	
9.5		32 59	3.6		9.2		57 13	48.9	A	9.4		42	40.3		9.5		51 2							
8.5		33 35	34.3		9.3		15	44.9	A	7.0		55	35.3	A	8.5		24							A
8.9		34 14	54.9		9.3		58 11	23.6		9.2		21 24	40.8	A	9.4		37							

2201—2234					2235—2268					2269—2302					2303—2336					2337—2369				
	23u		+62°			23u		+62°			23u		+62°			23u		+62°			23u		+62°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
9.5	23	8 25	14.8	B	9.3	23	22 0	13.6		8.7	23	33 18	56.5	A	9.1	23	42 22	39.2		9.1	23	51 26	51.2	
9.3		34	46.1		8.5		25	21.0		9.0		55	8.8		9.5		28	18.1		9.3		42	48.8	
9.4		40	17.3		9.5	23	4	13.5		9.1		59	9.0		9.5		35	8.8		9.5		45	47.6	
8.5		9 6	6.0	A	9.5		38	16.5		9.5	34	10	53.0		9.3		52	19.7		9.5		48	46.2	
9.2		28	51.5		9.5		41	35.5		9.5		17	0.3		9.4	43	7	41.8		8.8	52	2	22.2	
9.5		10 1	22.3		9.5		53	13.5		9.5		50	22.1		9.4		8	44.0		9.5		21	35.6	
9.5		23	56.1		9.5	24	43	56.2		8.7	35	13	9.1		9.5		21	19.8		8.2		25	11.0	A
9.2		58	20.4		8.9	25	21	36.3		9.3		19	35.2		6.9		21	56.3	B	9.4	53	46	48.2	
8.5		11 31	11.1	A	9.0		31	45.7		9.5		35	11.5		8.8		41	28.0		9.3		53	26.3	
8.5		12 22	41.6		7.3	26	12	20.6	A	9.5		37	10.6		9.4	44	48	25.1		9.3	54	1	41.5	
9.5		27	32.8		8.0		13	29.0	A	9.5	36	9	7.6		8.5		53	29.8	B	9.5		1	58.7	
9.5		53	20.1		8.0		29	20.0	A	9.0		14	8.6		9.4	45	4	33.3		9.4		21	53.8	
9.5		13 3	41.6		8.0		31	17.1	A	9.5		15	8.0		9.5		21	3.6		9.2		21	21.3	
9.5		21	8.3		9.5	27	5	46.1		9.3		29	37.4		9.2		47	1.5		8.9		29	30.4	
9.3		44	49.1		9.5		16	39.2		9.2		31	21.1		9.5		49	23.1		8.5		36	32.5	A
9.5		14 16	56.9		9.2		46	12.2		9.4		49	27.8		9.5	46	20	4.2		9.3		39	5.2	
9.5		22	32.8		8.8	28	4	51.5	A	9.5	37	1	28.0		9.1		35	45.1		9.4		59	5.1	
7.8		15 20	1.8	B	9.5		17	20.5		9.5		3	30.7		9.2		39	25.1		9.5	55	22	50.3	
9.5		24	55.9		8.7		29	12.4	A	9.3		11	50.7		9.5		55	13.8		9.5		52	21.3	
9.5		33	52.4		9.5	29	1	27.7		9.5		12	22.0		9.3	47	3	37.6		6.5	56	1	50.3	B
9.5		40	12.6		9.5		10	21.0		9.5		42	15.5		8.7		13	23.1	A	9.5		15	34.2	
9.3		16 28	50.9		9.3		16	25.0	B	9.5	38	3	38.3		9.5	48	4	27.8		9.5		29	13.9	
8.2		17 19	1.3	A	9.3		40	48.7		9.1		21	19.1		9.2		19	30.7		9.5	57	8	1.2	
9.5		18 22	21.4		9.3		47	56.2		9.5		40	37.9		9.3		19	20.2		9.5		38	35.2	
9.0		26	26.3	A	9.5	30	8	11.2		9.5		56	46.2		9.0		44	4.0		9.5		39	34.5	
9.5		19 12	18.1		9.5		39	31.3		7.2	39	5	30.1	A	9.5	49	7	36.4		9.5		56	59.0	
9.5		54	12.4		9.5	31	33	7.4		8.8	40	0	41.1		9.3		30	41.2		7.2	58	34	52.1	B
9.5		20 7	32.8		9.2	32	6	1.8		8.0		21	25.0		9.4		31	48.8		8.9		46	35.1	
9.5		20	12.6		9.2		8	52.8		9.5		25	34.1		9.5		43	24.1		9.5		54	50.4	
9.4		27	33.9	B	9.2		17	35.5		8.1		49	9.2		9.5		53	12.3		9.5	59	4	12.0	
9.5		29	26.2		9.3		37	26.1		9.2	41	2	35.0		9.5	50	4	18.4		9.0		6	24.7	A
9.4	21	18	26.3		9.5	33	1	35.9		9.1		13	59.9		9.5		55	48.0		9.5		11	50.5	
8.0		33	13.3	A	9.5		3	9.5		9.3		54	58.0		9.5	51	2	0.0		9.5		49	52.1	
7.9		49	35.8	A	6.7		6	55.4	A	9.3	42	3	8.5		9.5		6	49.0						

Zone +63°

1—40					41—80					81—120					121—160					161—200				
	0ʰ		+63°			0ʰ		+63°			0ʰ		+63°			0ʰ—1ʰ		+63°			1ʰ		+63°	
m	ʰ	′ ″	′		m	ʰ	′ ″	′		m	ʰ	′ ″	′		m	ʰ	′ ″	′		m	ʰ	′ ″	′	
9.5	0	0 49	17.9		9.5	0	17 10	52.5	R	7.3	0	34 20	30.3	A	9.5	0	50 21	36.4		8.8	1	4 50	51.8	
9.5		54	28.6		9.5		13	34.3		9.0		31	19.5	A	9.2		41	58.8		9.3		5 22	18.2	A
8.7		1 50	9.5	A	9.5		29	56.0		9.5		55	58.7		9.5		51 56	49.3		9.5		50	54.6	
9.3		2 17	48.9	A	9.4		36	1.0		9.5		35 12	28.9		9.5		52 15	10.3		8.8		6 19	33.4	A
8.0		33	50.4	A	8.7		51	2.9	B	9.5		23	23.4		9.5		31	51.7		9.1		8 12	0.3	
9.0		3 6	27.2		9.5		18 28	17.1		9.5		36 8	43.1		9.4		53 4	14.7		9.3		16	27.5	
9.4		37	58.1		9.0		29	20.0	R	9.4		11	33.3		9.5		23	17.2		9.4		42	32.4	
9.4		53	9.2	R	9.0		35	37.3		9.3		31	56.2		9.3		38	34.9		8.6		9 15	27.5	
9.4		4 45	7.6		9.1		55	42.6		9.0		38	36.3		9.5		54 23	7.4		9.4		42	39.3	
8.5		5 31	33.0	A	9.5		19 59	13.2		9.1		54	51.1	B	9.2		33	31.0	A	9.0		52	57.8	
9.4		48	43.9		9.4		20 33	55.4		9.4		37 18	57.2		9.5		55 5	27.0		9.5		10 25	0.9	
8.9		51	21.7		8.0		21 7	26.9	R	9.5		19	36.3		9.5		11	35.4		9.2		30	8.5	
8.5		53	11.8	A	7.0		22 4	56.8	B	9.4		39 1	55.7		9.5		21	46.2		9.2		45	16.2	
9.3		6 8	31.0		8.2		9	58.3	B	9.0		49	55.7		8.3		56 18	26.0	A	9.5		11 3	52.4	
8.0		7 0	45.4	A	8.0		44	16.4	A	9.0		40 2	54.0		9.5		57 3	57.4		8.6		29	54.5	A
9.5		14	58.5		9.3		58	4.5		9.5		40	0.9		9.4		4	5.5		6.6		30	53.4	A
9.3		22	2.6		9.0		23 9	43.1		8.3		41 10	50.4		8.7		23	9.8		9.5		12 21	5.9	
9.5		43	19.8		9.4		29	53.7		9.5		30	59.7		8.5		28	21.4	A	9.5		13 4	49.7	
9.2		8 35	23.7		9.5		51	2.8		5.8		59	27.1	L	8.2		29	38.4	A	9.5		43	32.4	
9.5		43	36.1		9.4		24 30	48.6	A	9.5		42 10	27.9		9.0		35	1.9		9.4		14 40	11.5	B
9.4		51	44.3		9.3		25 9	12.1		8.3		25	32.0	L	8.3		52	0.3	P	9.4		15 7	40.7	
9.5		9 37	1.6		9.5		34	41.1		9.5		43 29	53.0		8.5		58 35	37.4	A	9.1		16	7.8	
9.5		10 25	13.4		8.9		27 32	54.4		9.3		37	1.5		9.1		48	24.5	A	8.8		20	25.6	B
9.4		43	2.6		9.5		28 2	49.1		9.5		49	7.4		9.5		59 10	46.2		9.5		23	9.8	
9.5		56	47.9		9.5		12	11.7		8.3		44 10	9.5	A	9.5	1	0 48	47.2		9.5		16 28	30.5	
9.4		11 12	4.8		9.5		29 43	51.7		9.5		16	6.5		8.6		57	52.1	L	7.7		17 22	57.4	A
8.9		15	7.6		8.1		56	0.7	A	9.3		46	4.9		7.8		1 15	24.5	A	8.2		48	43.2	S
9.4		36	1.4		9.1		30 39	23.9		9.5		47	58.7		9.5		20	12.7		9.5		18 25	4.6	
9.4		43	4.8		9.1		32 13	50.4		9.3		45 54	44.3		6.0		2 4	25.5	A	9.5		31	15.7	
8.6		59	29.4	A	9.0		19	7.1	A	9.0		55	17.7		9.5		5	16.2		9.4		20 7	30.6	B
9.5		13 10	3.8	B	9.1		24	42.7		8.5		46 12	35.0		9.4		50	19.9		8.3		17	40.2	B
9.4		45	33.8		9.5		47	24.9		7.7		22	45.6	L	9.4		53	9.3		8.7		32	43.8	P
9.1		53	48.1	R	9.0		58	32.8		9.5		47	30.5		9.1		53	5.8	A	8.0		32	7.2	
9.5		14 2	46.6		9.4		33 12	39.4		8.2		47 17	3.2	A	9.3		57	19.2	B	9.3		58	41.[illegible]	
9.3		15	14.9	B	9.2		15	42.2	B	9.5		30	13.2		9.4		3 2	16.8	B	9.5		21 19	25	
9.5		17	36.3		9.5		21	46.7		8.7		42	59.7		7.8		9	51.0	B	8.5		46	3[illegible]	
9.5		25	49.0		9.3		21	53.7		7.0		48 1	45.2	L	9.0		37	57.6	B	8.8		22 2	2.	
8.5		16 15	29.8	A	9.2		35	35.0	B	8.5		49 24	20.1		9.0		52	53.4		9.5		51		
9.5		19	2.8		9.5		46	55.4		9.5		46	11.2		9.2		53	10.5	B	8.5		23 22		
8.3		17 7	50.1	A	9.3		55	30.0	A	9.5		50 12	20.1		9.1		4 13	29.0	A	9.4		41		

201—260					261—320					321—380					381—440					441—500				
	1ʰ		+63°			1ʰ—2ʰ		+63°			2ʰ		+63°			2ʰ—3ʰ		+63°			3ʰ—4ʰ		+63°	
m	ʰ	′	″	′	m	ʰ	′	″	′	m	ʰ	′	″	′	m	ʰ	′	″	′	m	ʰ	′	″	′	
9.2	1	23	45	1.3	9.1	1	46	55	19.7	9.5	2	9	29	24.3	9.2	2	50	42	52.6	B	8.7	3	29	29	41.8	A
9.5		24	18	59.9	9.3		47	6	44.7	7.8			35	12.2	A	9.5		51	16	12.1		9.5			57	8.8	
9.0			28	54.8	A	9.5			45	47.3	9.0		10	34	15.0	A	9.4			30	50.1		9.2		30	56	14.2	
9.5			51	10.8		9.3		48	23	7.5	9.5			48	12.1		9.4			32	57.9		9.3		31	40	25.5	
9.3		25	46	4.5		5.5		49	2	55.0	A	9.5		11	37	25.6		9.0		52	7	2.3	A	9.3		32	57	3.9	
8.3			48	24.0		9.3			22	37.9		8.5			54	10.4	A	9.2			12	11.6	A	9.5		34	3	1.9	
9.5		26	19	51.2		9.5			53	1.2		8.6		12	29	4.0	A	8.5			40	11.6	A	9.5			55	18.2	
9.5			29	55.5		9.3			55	10.0		9.0			47	27.3		9.2			42	11.2	A	9.5		35	51	8.3	
8.5			34	41.9	A	9.3		50	3	11.6		9.5		13	5	42.5		8.5			48	8.6	A	9.1		36	1	53.7	
8.4			40	46.6	A	9.5			51	27.3		8.2		14	3	54.4	A	6.0		55	14	30.0	A	9.1		37	3	36.3	
9.5		28	10	19.6		9.5			59	2.1		9.5			35	41.5		9.0			37	53.1	A	8.0			49	15.7	A
8.2			45	47.0	A	9.4		51	18	23.8		9.5			47	2.7		9.5			43	0.6		9.5		38	50	34.3	
9.4			50	34.9		8.5			33	56.0	A	8.8		15	31	22.4		9.1			51	16.3		9.5			50	5.2	
8.5		29	9	21.5		6.0		52	20	41.5	A	9.5		18	53	13.5		9.3		57	5	32.3	B	9.0			50	59.0	A
9.5			25	9.4		9.5			23	54.0		8.0		19	59	53.6	A	7.0			11	44.5	L	9.2			54	10.3	A
8.7		30	22	51.1	A	9.5			47	25.3		9.5		20	48	58.2		9.5			45	14.7		9.0		39	11	11.1	A
8.4			25	25.0	A	7.8		53	9	32.7	A	9.5			49	37.1		9.5		58	20	54.0		8.7			28	2.4	A
8.0			48	26.0	A	9.5			12	39.2		9.4		21	53	6.7		7.0			45	14.5	S	7.8		40	25	2.4	A
9.5			58	3.4		9.3			48	40.1		9.5		24	27	33.8		8.5		59	52	49.5	A	9.0			44	48.6	
8.8		31	5	34.4	A	9.2			51	37.2		9.5			57	19.9		9.1	3	0	15	50.5	A	8.8			46	28.4	
8.8			12	38.0	A	8.0		54	17	40.8	A	9.4		25	42	11.7		9.3			23	29.4		9.5		41	16	58.7	
8.3		32	27	52.1	A	9.2			22	48.2	B	9.0			59	13.5	A	8.8		1	13	2.4	A	9.2		42	58	42.1	A
9.3			28	47.7		9.4			27	51.5		7.2		26	0	27.7	A	8.8		2	39	19.6	A	9.4		43	50	17.6	
7.7			38	9.5	A	9.5			32	10.7		9.4			5	10.0		8.5			50	24.5	A	9.3		44	10	23.0	
8.6			40	39.4	A	9.5			43	39.9		9.4			34	52.6		9.5		3	18	55.5		9.0			34	26.8	B
8.8			56	19.2		9.5			48	7.8		8.5		27	44	5.5		9.4		4	37	12.7		8.5		45	35	54.1	
9.3		33	2	41.7		8.7			49	35.9	A	9.1			51	0.2		8.8		5	23	39.3		9.5		46	14	38.8	
9.3			5	20.0		8.9		55	2	0.5	A	9.5		28	56	50.4		9.5		6	33	42.3		9.4		48	30	29.0	
8.2			39	7.5	A	9.5			24	2.8		9.3		29	31	44.3	B	9.5		8	32	35.9		8.1			31	28.5	A
8.5		34	38	36.0	A	8.5			33	53.2	A	9.2		30	22	46.5	A	9.3		9	6	9.3		8.5			34	55.8	A
9.0		35	0	28.5		9.2			53	28.2	A	9.5			33	57.4		9.5		11	35	42.1		9.0			52	27.5	A
7.8			10	49.9	A	9.5			55	47.2		9.2		31	32	57.0		8.9		13	34	25.0	A	9.3		49	31	25.3	
9.4			27	57.0		9.5		56	6	3.7		9.5			56	28.2		9.1		14	4	43.7		8.7			44	5.6	A
9.5			41	27.5		8.6			18	56.7	A	9.0		32	42	33.7		8.8			40	18.1	A	8.5		50	25	50.8	
9.0			51	21.5		9.5		58	13	50.8		8.4		33	2	4.4	A	9.5		15	42	26.0		9.4		51	21	14.8	B
8.4			52	5.3	A	9.5			18	58.6		9.4			19	25.8		9.5		16	36	12.8		9.5			30	29.4	
9.5		36	2	57.2		9.4			22	47.3		9.0			24	21.9		8.8			43	54.4		9.4		52	43	18.9	A
6.1		37	19	8.1	B	9.4			47	27.3		9.5		38	38	52.8	B	9.1		17	16	9.8	A	9.5			57	58.9	
9.5			22	50.7		9.5			58	21.9		8.3		39	10	2.3	B	9.5		18	4	31.3		9.0		53	1	30.9	A
9.5			31	27.0		9.4		59	40	22.8		8.8			24	11.8	A	9.3			5	19.3		7.0			28	19.9	A
9.4			32	7.0		9.0	2	0	28	27.7	A	9.5		40	8	42.1		9.2		19	46	19.6		9.5		55	0	2.7	
9.5			40	49.0		9.5			54	59.6		8.8		41	4	17.7	A	9.3		20	7	8.8		8.9			13	24.5	L
9.5		38	21	5.9		9.5		1	6	32.1		8.0			47	2.9	A	9.5			54	48.1		8.7			27	0.4	
9.5			34	50.1		9.3			32	53.3		8.5			48	51.0		8.8		21	19	58.0		9.1			33	44.1	
9.5			53	57.1		9.4		2	50	41.1		9.3		42	19	13.5	A	8.5			34	47.0	A	8.7		56	7	27.7	L
9.5		39	10	42.2		9.5			57	27.8		8.4			28	42.0	A	7.5		22	1	23.5	A	9.5		58	47	18.1	
9.5			14	36.9		9.5		3	23	38.5		7.0		43	23	32.4	A	9.5			33	0.5		9.0			59	8	34.3	
9.5		40	30	40.3		9.5			27	35.2		9.5			54	49.1	R	9.3			44	44.2	B	9.4	4	1	19	2.4	
8.7		41	9	49.3	R	9.4		4	7	29.7		6.5		44	30	44.0	A	9.3		23	8	29.9		9.5			44	31.8	
9.0			46	59.0		8.0			17	20.6	B	6.5		46	3	50.2	A	8.5			9	44.9	B	9.1			4	58	52.9	A
9.5			59	0.4		9.1			18	8.1		8.8			4	23.8	R	9.5			58	31.9		8.0			5	56	35.8	A
9.3		42	42	50.1		9.5		7	12	12.6		9.0			13	17.7	B	9.5		24	27	28.4		9.5			6	30	18.5	
9.1		43	1	29.0		9.1			28	9.6	A	9.5			52	17.9		9.4			34	7.4		9.5			7	31	19.8	
9.5			19	21.5		9.5			39	40.5		9.4		47	15	40.2	B	9.0		25	36	45.7	A	8.5			8	23	28.7	
9.3			29	56.2		7.0			40	44.5	A	9.5			41	9.6		9.5			58	44.1		8.8			10	9	0.1	A
9.4		44	27	7.4		7.0			56	16.1	A	9.1		49	54	28.2		7.2		27	15	49.2	A	8.8			35	16.5	
9.3		45	23	34.1	B	9.3		8	16	54.6		9.5		50	12	45.5		7.0			17	24.5	A	9.4			11	7	49.3	
9.2			37	49.3		9.4			33	3.0		9.5			15	13.0		8.5			26	24.3	A	9.5			47	59.5	
9.5		46	20	11.2		9.3			45	0.4	B	9.4			20	37.9		9.4			48	12.2		9.3			12	8	17.0	
9.4			44	37.9		7.0		9	8	40.5	L	8.4			27	47.9	A	9.5		28	56	59.7		8.5				24	20.1	L

501—560					561—620					621—680					681—740					741—800				
	4h			+63°		4h—5h			+63°		5h—6h			+63°		6h—7h			+63°		7h—8h			+63°
m	h	′	″	′	m	h	′	″	′		m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	
9.5	4	14	48	44.0	8.3	4	50	53	55.7	A	9.5	5	48	43	3.8	9.5	6	50	19	2.5	9.4	7	40	36	7.9	
9.2		15	3	57.8	9.0		53	25	7.1		9.5		49	23	20.2	9.3		51	16	0.5	A	9.4		41	48	3.2	
9.5			36	8.6	9.5			47	33.5		9.0			49	50.7	9.2			27	54.0		8.5		42	14	42.9	A
8.9		16	57	54.6	9.5		55	23	53.7		8.7		50	45	28.9	B	8.4		52	7	39.2	A	9.5		43	31	5.2	
9.2		17	7	53.7	8.0			59	37.4	A	7.6		51	21	42.9	B	9.2			8	0.5	A	9.5		46	18	5.7	
8.3			37	5.4	S	7.0		56	58	23.2	A	9.3			27	17.0	8.1			48	2.0	A	9.5			36	56.2	
9.0		18	44	55.7		9.5		57	27	38.4		8.9			29	21.7	9.3		54	27	51.6	B	9.5		47	55	52.8	
9.1			45	31.1	R	9.4			43	19.2		9.4			54	50.7	9.4		55	7	9.2		9.0		49	9	20.3	A
8.7		19	2	40.8		9.5		58	45	6.1		8.5		52	23	50.4	9.4			26	46.2	B	6.0			33	28.4	A
9.2			42	0.5		8.8		59	0	54.9	A	6.5			47	27.2	A	8.4			59	6.3		8.3			39	29.5	A
7.0			49	50.9	A	9.3			53	26.6	B	8.7			51	22.9	A	9.0		56	45	50.5	A	9.2			40	24.8	A
9.3		21	29	18.5	A	9.5	5	0	38	15.9		9.5		53	24	36.4		8.2		57	4	31.7	A	9.5			43	19.3	
9.5		22	12	30.7		9.1		1	20	9.5		9.5			40	18.7		9.1	7	0	25	10.9	A	9.4		50	14	55.0	
9.5			40	4.0		9.3		4	41	59.7	B	9.5		55	29	23.9	B	9.2		1	26	5.5	A	9.0		54	3	19.3	
6.3			52	57.1	A	9.2		5	10	25.7		9.3		56	51	41.0		9.2		2	35	3.7	A	9.5		55	23	55.8	
9.5		23	26	5.3	A	9.1			15	41.7		9.4		57	5	32.3		8.9			37	58.7	A	9.5		57	16	15.3	
9.3			46	48.1		8.0		9	40	58.7	B	9.4			35	29.8		9.4		4	9	4.2	A	8.8			42	33.4	A
9.4			57	42.7		9.4		10	10	53.4		9.5			40	31.8		9.1			20	56.1		8.4		58	1	32.9	A
9.4		24	6	41.0		7.0		11	2	13.9	A	9.5		59	38	26.1		8.9			52	48.7	A	8.9	8	0	10	32.2	A
9.0			58	2.7	A	8.4			14	55.8	A	9.3	6	0	32	41.3	A	9.2		5	6	47.3	A	9.4			46	57.8	B
9.1			59	3.5	B	9.0		12	25	55.8	A	8.5		3	19	18.4	A	9.4			47	9.5		8.0			51	30.9	A
9.4		25	24	7.7		9.5			53	22.3		8.8		7	15	3.4	A	8.7		6	17	14.7	B	9.5		1	6	53.0	B
9.5		26	1	46.5		8.5		16	8	26.2	A	9.5		9	12	13.2		9.4		7	6	1.2		9.5			34	57.9	
9.5		27	0	23.1		9.3			24	11.5		9.1		11	15	23.4		9.5		8	1	59.5		9.5			40	54.8	
9.4			26	41.6	A	8.5			39	49.3	A	8.5			59	42.6	A	7.9		9	11	7.8	B	9.1			46	20.8	
9.2		28	39	31.8	A	9.0		17	8	29.7	A	9.0		14	29	49.1		9.4			46	32.5		9.5			48	53.1	
9.5			41	27.2		9.1			18	40.5		9.5		15	0	57.3		9.4		12	49	19.8		9.5		2	52	25.1	
9.3			41	18.7	B	9.5		18	46	1.8		9.5		17	34	48.5		9.2		14	5	19.9	B	8.8		3	1	31.4	
9.5			48	30.8		9.5			53	51.7		8.7		19	37	14.6	A	9.1			12	37.9	A	9.0			5	7.4	A
9.1		29	1	38.2	A	9.2		20	5	51.0		9.2		21	6	39.2		8.5			20	16.6	B	7.7		5	56	40.3	A
9.5			13	55.8		9.5			25	27.8		9.2		23	15	7.3		9.5		15	24	6.5		9.5		7	11	30.9	
9.1		31	47	23.1		8.0		22	11	23.3	A	8.6		24	2	57.5	A	8.7		17	4	16.7	A	9.1			24	2.5	
9.5		32	30	40.5		8.6			57	23.3	A	9.5			50	48.1		9.4			34	10.0		9.5		9	38	58.9	
9.0			37	44.2		9.3		23	22	56.2		9.5		26	43	4.9		9.3			57	28.3		9.5			42	45.2	
9.4		36	3	36.6		9.5			41	50.9		9.2		28	18	31.4	A	8.6		18	47	7.5	A	9.0		12	29	53.1	
7.0			38	21.7	L	9.0		24	10	48.8	A	8.6			32	36.8	A	8.5			58	0.2	A	9.1		13	0	19.8	B
9.3			52	4.4		9.0			43	11.2	A	7.2		30	27	5.8	A	9.4		19	56	59.2		8.6			56	9.2	B
9.2			56	13.2		8.5		26	13	8.1	A	8.0		33	48	11.8	A	8.0		21	26	28.5	B	8.9		15	4	3.3	B
9.5		37	3	48.6		7.0		27	58	12.0	A	9.1		35	14	51.4	A	7.7		23	41	39.0	B	9.3			7	3.0	B
9.3			41	54.0		9.5		30	30	15.0		9.3		36	43	2.6	B	9.3		24	6	9.5		9.4			17	35.4	B
9.3		38	4	40.7		9.4			58	22.1	B	9.0		37	30	12.8	A	9.4		25	9	30.0		9.5			38	34.7	
9.2			17	6.5		7.3		32	6	13.4	B	8.7		39	38	8.3	A	9.4			39	5.6		9.5		16	38	54.1	
5.8			33	15.0	A	9.5		33	15	18.8		9.5		40	40	37.8		9.3		26	12	30.5	B	9.5			42	25.1	
9.2		39	7	9.6		7.4			39	32.1	L	9.5		41	4	44.7		9.5			14	26.5		8.0		20	32	19.6	A
8.8		40	10	47.2		8.9			48	13.5		9.4		42	21	28.5		9.0		27	18	51.1		9.2		22	9	40.0	
9.5		41	29	30.0		9.2		34	30	39.4	B	9.5			25	24.0		9.3			33	19.9	B	9.5			48	46.9	
9.1		42	53	31.5		9.5			49	54.8		9.5		43	14	30.8		9.3		28	24	3.7		9.1		23	22	9.3	
8.4		43	41	9.5	A	9.2		35	2	38.5	B	9.4			15	32.8	B	9.3		29	17	49.0	B	9.5		25	35	51.1	
9.0		44	32	33.0		9.0			3	38.1	B	9.2			39	20.8	A	9.3			31	41.1	B	7.8		29	31	58.3	A
9.5			53	42.4		9.4			39	14.7		9.0			48	25.5	A	9.3			45	32.1		8.9			56	55.1	A
8.4		45	33	8.0	A	9.5		37	30	37.1		8.8		44	4	36.1	A	9.5		31	46	57.3		8.3		30	0	35.9	A
9.2			38	9.2	B	8.9		39	35	24.8	A	7.5			23	11.8	A	8.5		32	41	42.8	B	8.3			49	50.1	A
9.5		46	5	52.5		9.4		40	9	12.3	A	9.5			32	43.3		7.0		33	18	10.5	A	9.1		31	11	54.0	A
9.3			55	6.6		9.4			38	21.6	A	9.5		46	3	48.6		8.8			29	51.1		9.1			55	54.0	A
9.2		47	32	29.2		8.9		42	15	51.8	A	9.5			10	45.2		8.7		34	53	25.3	A	9.0		32	13	10.8	
9.4		48	14	28.2		7.9			18	14.8	A	9.3		47	12	42.4	A	9.4		37	33	25.7		9.5			44	23.0	
8.9			37	32.7	B	9.3		43	14	17.5	B	9.5			18	2.0	A	9.0		38	14	11.0	A	9.1		34	30	34.8	
9.5		50	27	9.5		9.0		44	45	46.7	A	7.3		48	12	51.8	A	9.4		39	37	8.9	B	8.0		36	37	51.5	A
8.9			33	21.3	A	8.6		47	10	35.9	A	9.5		49	35	57.0		8.4			39	26.2	A	9.4			53	42.7	A
9.3			50	28.1		9.4		48	37	6.6		9.5		50	9	59.4		7.8			45	15.8	A	9.5			59	5.4	

201—260				261—320				321—380				381—440				441—500			
	1ᵘ		+63°		1ᵘ—2ᵘ		+63°		2ᵘ		+63°		2ᵘ—3ᵘ		+63°		3ᵘ—4ᵘ		+63°
m	ᵘ ′ ″		′	m	ᵘ ′ ″		′	m	ᵘ ′ ″		′	m	ᵘ ′ ″		′	m	ᵘ ′ ″		′
9.2	1 23	45	1.3	9.1	1 46	55	19.7	9.5	2 9	29	24.3	9.2	2 50	42	52.6	B	8.7	3 29	29	41.8	A
9.5	24	18	59.9	9.3	47	6	44.7	7.8		35	12.2	A	9.5	51	16	12.1		9.5		57	8.8	
9.0		28	54.8	A	9.5		45	47.3	9.0	10	34	15.0	A	9.4		30	50.1		9.2	30	56	14.2	
9.5		51	10.8		9.3	48	23	7.5	9.5		48	12.1		9.4		32	57.9		9.3	31	40	25.5	
9.3	25	46	4.5		5.5	49	2	55.0	A	9.5	11	37	25.6		9.0	52	7	2.3	A	9.3	32	57	3.9	
8.3		48	24.0		9.3		22	37.9		8.5		54	10.4	A	9.2		12	11.6	A	9.5	34	3	1.9	
9.5	26	19	51.2		9.5		53	1.2		8.6	12	29	4.0	A	8.5		40	11.6	A	9.5		55	18.2	
9.5		29	55.5		9.3		55	10.0		9.0		47	27.3		9.2		42	11.2	A	9.5	35	51	8.3	
8.5		34	41.9	A	9.3	50	3	11.6		9.5	13	5	42.5		8.5		48	8.6	A	9.1	36	1	53.7	
8.4		40	46.6	A	9.5		51	27.3		8.2	14	3	54.4	A	6.0	55	14	30.0	A	9.1	37	3	36.3	
9.5	28	10	19.6		9.5		59	2.1		9.5		35	41.5		9.0		37	53.1	A	8.0		49	15.7	A
8.2		45	47.0	A	9.4	51	18	23.8		9.5		47	2.7		9.5		43	0.6		9.5	38	50	34.3	
9.4		50	34.9		8.5		33	56.0	A	8.8	15	31	22.4		9.1		51	16.3		9.5		50	5.2	
8.5	29	9	21.5		6.0	52	20	41.5	A	9.5	18	53	13.5		9.3	57	5	32.3	B	9.0		50	59.0	A
9.5		25	9.4		9.5		23	54.0		8.0	19	59	53.6	A	7.0		11	44.5	L	9.2		54	10.3	A
8.7	30	22	51.1	A	9.5		47	25.3		9.5	20	48	58.2		9.5		45	14.7		9.0	39	11	11.1	A
8.4		25	25.0	A	7.8	53	9	32.7	A	9.5		49	37.1		9.5	58	20	54.0		8.7		28	2.4	A
8.0		48	26.0	A	9.5		12	39.2		9.4	21	53	6.7		7.0		45	14.5	S	7.8	40	25	2.4	A
9.5		58	3.4		9.3		48	40.1		9.5	24	27	33.8		8.5	59	52	49.5	A	9.0		44	48.6	
8.8	31	5	34.4	A	9.2		51	37.2		9.5		57	19.9		9.1	3 0	15	50.5	A	8.8		46	28.4	
8.8		12	38.0	A	8.0	54	17	40.8	A	9.4	25	42	11.7		9.3		23	29.4		9.5		41	16	58.7	
8.3	32	27	52.1	A	9.2		22	48.2	B	9.0		59	13.5	A	8.8		1 13	2.4	A	9.2		42	58	42.1	A
9.3		28	47.7		9.4		27	51.5		7.2	26	0	27.7	A	8.8		2 39	19.6	A	9.4		43	50	17.6	
7.7		38	9.5	A	9.5		32	10.7		9.4		5	10.0		8.5		50	24.5	A	9.3		44	10	23.0	
8.6		40	39.4	A	9.5		43	39.9		9.4		34	52.6		9.5		3 18	55.5		9.0		34	26.8	B
8.8		56	19.2		9.5		48	7.8		8.5	27	44	5.5		9.4		4 37	12.7		8.5		45	35	54.1	
9.3	33	2	41.7		8.7		49	35.9	A	9.1		51	0.2		8.8		5 23	39.3		9.5		46	14	38.8	
9.3		5	20.0		8.9	55	2	0.5	A	9.5	28	56	50.4		9.5		6 33	42.3		9.4		48	30	29.0	
8.2		39	7.5	A	9.5		24	2.8		9.3	29	31	44.3	B	9.5		8 32	35.9		8.1			31	28.5	A
8.5	34	38	36.0	A	8.5		33	53.2	A	9.2	30	22	46.5	A	9.3		9 6	9.3		8.5			34	55.8	A
9.0	35	0	28.5		9.2		53	28.2	A	9.5		33	57.4		9.5		11 35	42.1		9.0			52	27.5	A
7.8		10	49.9	A	9.5		55	47.2		9.2	31	32	57.0		8.9		13 34	25.0	A	9.3		49	31	25.3	
9.4		27	57.0		9.5	56	6	3.7		9.5		56	28.2		9.1		14 4	43.7		8.7			44	5.6	A
9.5		41	27.5		8.6		18	56.7	A	9.0	32	42	33.7		8.8		40	18.1	A	8.5		50	25	50.8	
9.0		51	21.5		9.5	58	13	50.8		8.4	33	2	4.4	A	9.5		15 42	26.0		9.4		51	21	14.8	B
8.4		52	5.3	A	9.5		18	58.6		9.4		19	25.8		9.5		16 36	12.8		9.5			30	29.4	
9.5	36	2	57.2		9.4		22	47.3		9.0		24	21.9		8.8		43	54.4		9.4		52	43	18.9	A
6.1	37	19	8.1	B	9.4		47	27.3		9.5	38	38	52.8	B	9.1		17 16	9.8	A	9.5			57	58.9	
9.5		22	50.7		9.5		58	21.9		8.3	39	10	2.3	B	9.5		18 4	31.3		9.0		53	1	30.9	A
9.5		31	27.0		9.4	59	40	22.8		8.8		24	11.8	A	9.3		5	19.3		7.0			28	19.9	A
9.4		32	7.0		9.0	2 0	28	27.7	A	9.5	40	8	42.1		9.2		19 46	19.6		9.5		55	0	2.7	
9.5		40	49.0		9.5		54	59.6		8.8	41	4	17.7	A	9.3		20 7	8.8		8.9			13	24.5	L
9.5	38	21	5.9		9.5		1 6	32.1		8.0		47	2.9	A	9.5		54	48.1		8.7			27	0.4	
9.5		34	50.1		9.3		32	53.3		8.5		48	51.0		8.8		21 19	58.0		9.1			33	44.1	
9.5		53	57.1		9.4		2 50	41.1		9.3	42	19	13.5	A	8.5		34	47.0	A	8.7		56	7	27.7	L
9.5	39	10	42.2		9.5		57	27.8		8.4		28	42.0	A	7.5		22 1	23.5	A	9.5		58	47	18.1	
9.5		14	36.9		9.5		3 23	38.5		7.0	43	23	32.4	A	9.5		33	0.5		9.0		59	8	34.3	
9.5	40	30	40.3		9.5		27	35.2		9.5		54	49.1	R	9.3		44	44.2	B	9.4	4	1	19	2.4	
8.7	41	9	49.3	R	9.4		4 7	29.7		6.5	44	30	44.0	A	9.3		23 8	29.9		9.5			44	31.8	
9.0		46	59.0		8.0		17	20.6	B	6.5	46	3	50.2	A	8.5		9	44.9	B	9.1		4	58	52.9	A
9.5		59	0.4		9.1		18	8.1		8.8		4	23.8	R	9.5		58	31.9		8.0		5	56	35.8	A
9.3	42	42	50.1		9.5		7 12	12.6		9.0		13	17.7	B	9.5		24 27	28.4		9.5		6	30	18.5	
9.1	43	1	29.0		9.1		28	9.6	A	9.5		52	17.9		9.4		34	7.4		9.5		7	31	19.8	
9.5		19	21.5		9.5		39	40.5		9.4	47	15	40.2	B	9.0		25 36	45.7	A	8.5		8	23	28.7	
9.3		29	56.2		7.0		40	44.5	A	9.5		41	9.6		9.5		58	44.1		8.8		10	9	0.1	A
9.4	44	27	7.4		7.0		56	16.1	A	9.1	49	54	28.2		7.2		27 15	49.2	A	8.8			35	16.5	
9.3	45	23	34.1	B	9.3		8 16	54.6		9.5	50	12	45.5		7.0		17	24.5	A	9.4		11	7	49.3	
9.2		37	49.3		9.4		33	3.0		9.5		15	13.0		8.5		26	24.3	A	9.5			47	59.5	
9.5	46	20	11.2		9.3		45	0.4	B	9.4		20	37.9		9.4		48	12.2		9.3		12	8	17.0	
9.4		44	37.9		7.0	9	8	40.5	L	8.4		27	47.9	A	9.5	28	56	59.7		8.5			24	20.1	L

501—560				561—620				621—680				681—740				741—800			
	4ʰ		+63°		4ʰ—5ʰ		+63°		5ʰ—6ʰ		+63°		6ʰ—7ʰ		+63°		7ʰ—8ʰ		+63°
m	h m s		′	m	h m s		′	m	h m s		′	m	h m s		′	m	h m s		′
9.5	4 14	48	44.0	8.3	4 50	53	55.7	A	9.5	5 48	43	3.8	9.5	6 50	19	2.5	9.4	7 40	36	7.9
9.2	15	3	57.8	9.0	53	25	7.1		9.5	49	23	20.2	9.3	51	16	0.5	A	9.4	41	48	3.2
9.5		36	8.6	9.5		47	33.5		9.0		49	50.7	9.2		27	54.0		8.5	42	14	42.9	A
8.9	16	57	54.6	9.5	55	23	53.7		8.7	50	45	28.9	B	8.4	52	7	39.2	A	9.5	43	31	5.2	
9.2	17	7	53.7	8.0		59	37.4	A	7.6	51	21	42.9	B	9.2		8	0.5	A	9.5	46	18	5.7	
8.3		37	5.4	S	7.0	56	58	23.2	A	9.3		27	17.0		8.1		48	2.0	A	9.5		36	56.2	
9.0	18	44	55.7		9.5	57	27	38.4		8.9		29	21.7		9.3	54	27	51.6	B	9.5	47	55	52.8	
9.1		45	31.1	R	9.4		43	19.2		9.4		54	50.7		9.4	55	7	9.2		9.0	49	9	20.3	A
8.7	19	2	40.8		9.5	58	45	6.1		8.5	52	23	50.4		9.4		26	46.2	B	6.0		33	28.4	A
9.2		42	0.5		8.8	59	0	54.9	A	6.5		47	27.2	A	8.4		59	6.3		8.3		39	29.5	A
7.0		49	50.9	A	9.3		53	26.6	B	8.7		51	22.9	A	9.0	56	45	50.5	A	9.2		40	24.8	A
9.3	21	29	18.5	A	9.5	5 0	38	15.9		9.5	53	24	36.4		8.2	57	4	31.7	A	9.5		43	19.3	
9.5	22	12	30.7		9.1		1 20	9.5		9.5		40	18.7		9.1	7 0	25	10.9	A	9.4	50	14	55.0	
9.5		40	4.0		9.3		4 41	59.7	B	9.5	55	29	23.9	B	9.2	1	26	5.5	A	9.0	54	3	19.3	
6.3		52	57.1	A	9.2		5 10	25.7		9.3	56	51	41.0		9.2	2	35	3.7	A	9.5	55	23	55.8	
9.5	23	26	5.3	A	9.1		15	41.7		9.4	57	5	32.3		8.9		37	58.7	A	9.5	57	16	15.3	
9.3		46	48.1		8.0		9 40	58.7	B	9.4		35	29.8		9.4	4	9	4.2	A	8.8		42	33.4	A
9.4		57	42.7		9.4		10 10	53.4		9.5		40	31.8		9.1		20	56.1		8.4	58	1	32.9	A
9.4	24	6	41.0		7.0		11 2	13.9	A	9.5	59	38	26.1		8.9		52	48.7	A	8.9	8 0	10	32.2	A
9.0		58	2.7	A	8.4		14	55.8	A	9.3	6 0	32	41.3	A	9.2	5	6	47.3	A	9.4		46	57.8	B
9.1		59	3.5	B	9.0		12 25	55.8	A	8.5	3	19	18.4	A	9.4		47	9.5		8.0		51	30.9	A
9.4	25	24	7.7		9.5		53	22.3		8.8	7	15	3.4	A	8.7	6	17	14.7	B	9.5	1	6	53.0	B
9.5	26	1	46.5		8.5	16	8	26.2	A	9.5	9	12	13.2		9.4	7	6	1.2		9.5		34	57.9	
9.5	27	0	23.1		9.3		24	11.5		9.1	11	15	23.4		9.5	8	1	59.5		9.5		40	54.8	
9.4		26	41.6	A	8.5		39	49.3	A	8.5		59	42.6	A	7.9	9	11	7.8	B	9.1		46	20.8	
9.2	28	39	31.8	A	9.0	17	8	29.7	A	9.0	14	29	49.1		9.4		46	32.5		9.5		48	53.1	
9.5		41	27.2		9.1		18	40.5		9.5	15	0	57.3		9.4	12	49	19.8		9.5	2	52	25.1	
9.3		41	18.7	B	9.5	18	46	1.8		9.5	17	34	48.5		9.2	14	5	19.9	B	8.8	3	1	31.4	
9.5		48	30.8		9.5		53	51.7		8.7	19	37	14.6	A	9.1		12	37.9	A	9.0		5	7.4	A
9.1	29	1	38.2	A	9.2	20	5	51.0		9.2	21	6	39.2		8.5		20	16.6	B	7.7	5	56	40.3	A
9.5		13	55.8		9.5		25	27.8		9.2	23	15	7.3		9.5	15	24	6.5		9.5	7	11	30.9	
9.1	31	47	23.1		8.0	22	11	23.3	A	8.6	24	2	57.5	A	8.7	17	4	16.7	A	9.1		24	2.5	
9.5	32	30	40.5		8.6		57	23.3	A	9.5		50	48.1		9.4		34	10.0		9.5	9	38	58.9	
9.0		37	44.2		9.3	23	22	56.2		9.5	26	43	4.9		9.3		57	28.3		9.5		42	45.2	
9.4	36	3	36.6		9.5		41	50.9		9.2	28	18	31.4	A	8.6	18	47	7.5	A	9.0	12	29	53.1	
7.0		38	21.7	L	9.0	24	10	48.8	A	8.6		32	36.8	A	8.5		58	0.2	A	9.1	13	0	19.8	B
9.3		52	4.4		9.0		43	11.2	A	7.2	30	27	5.8	A	9.4	19	56	59.2		8.6		56	9.2	B
9.2		56	13.2		8.5	26	13	8.1	A	8.0	33	48	11.8	A	8.0	21	26	28.5	B	8.9	15	4	3.3	B
9.5	37	3	48.6		7.0	27	58	12.0	A	9.1	35	14	51.4	A	7.7	23	41	39.0	B	9.3		7	3.0	B
9.3		41	54.0		9.5	30	30	15.0		9.3	36	43	2.6	B	9.3	24	6	9.5		9.4		17	35.4	B
9.3	38	4	40.7		9.4		58	22.1	B	9.0	37	30	12.8	A	9.4	25	9	30.0		9.5		38	34.7	
9.2		17	6.5		7.3	32	6	13.4	B	8.7	39	38	8.3	A	9.4		39	5.6		9.5	16	38	54.1	
5.8		33	15.0	A	9.5	33	15	18.8		9.5	40	40	37.8		9.3	26	12	30.5	B	9.5		42	25.1	
9.2	39	7	9.6		7.4		39	32.1	L	9.5	41	4	44.7		9.5		14	26.5		8.0	20	32	19.6	A
8.8	40	10	47.2		8.9		48	13.5		9.4	42	21	28.5		9.0	27	18	51.1		9.2	22	9	40.0	
9.5	41	29	30.0		9.2	34	30	39.4	B	9.5		25	24.0		9.3		33	19.9	B	9.5		48	46.9	
9.1	42	53	31.5		9.5		49	54.8		9.5	43	14	30.8		9.3	28	24	3.7		9.1	23	22	9.3	
8.4	43	41	9.5	A	9.2	35	2	38.5	B	9.4		15	32.8	B	9.3	29	17	49.0	B	9.5	25	35	51.1	
9.0	44	32	33.0		9.0		3	38.1	B	9.2		39	20.8	A	9.3		31	41.1	B	7.8	29	31	58.3	A
9.5		53	42.4		9.4		39	14.7		9.0		48	25.5	A	9.3		45	32.1		8.9		56	55.1	A
8.4	45	33	8.0	A	9.5	37	30	37.1		8.8	44	4	36.1	A	9.5	31	46	57.3		8.3	30	0	35.9	A
9.2		38	9.2	B	8.9	39	35	24.8	A	7.5		23	11.8	A	8.5	32	41	42.8	B	8.3		49	50.1	A
9.5	46	5	52.5		9.4	40	9	12.3	A	9.5		32	43.3		7.0	33	18	10.5	A	9.1	31	11	54.0	A
9.3		55	6.6		9.4		38	21.6	A	9.5	46	3	48.6		8.8		29	51.1		9.1		55	54.0	A
9.2	47	32	29.2		8.9	42	15	51.8	A	9.5		10	45.2		8.7	34	53	25.3	A	9.0	32	13	10.8	
9.4	48	14	28.2		7.9		18	14.8	A	9.3	47	12	42.4	A	9.4	37	33	25.7		9.5		44	23.0	
8.9		37	32.7	B	9.3	43	14	17.5	B	9.5		18	2.0	A	9.0	38	14	11.0	A	9.1	34	30	34.8	
9.5	50	27	9.5		9.0	44	45	46.7	A	7.3	48	12	51.8	A	9.4	39	37	8.9	B	8.0	36	37	51.5	A
8.9		33	21.3	A	8.6	47	10	35.9	A	9.5	49	35	57.0		8.4		39	26.2	A	9.4		53	42.7	A
9.3		50	28.1		9.4	48	37	6.6		9.5	50	9	59.4		7.8		45	15.8	A	9.5		59	5.4	

801—860				861—920				921—980				981—1040				1041—1100			
	8ᵘ—9ᵘ	+63°			9ᵘ—10ᵘ	+63°			10ᵘ—11ᵘ	+63°			11ᵘ—12ᵘ	+63°			12ᵘ—13ᵘ	+63°	
m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′	
9.1	8 37 58	53.0		7.0	9 36 30	55.1	A	9.2	10 35 49	29.0	R	7.8	11 45 15	43.8	A	9.4	12 52 15	29.6	
9.3	39 3	4.6	B	9.5	38 44	19.4		9.0	36 3	21.4	R	7.8	18	33.5	A	9.5	55 23	20.8	
9.4	13	5.4		9.5	40 43	52.5		9.3	37 36	7.6	R	9.3	46 19	1.1		9.5	58 0	48.2	
8.9	38	39.7	A	9.5	53	16.5		8.8	38 44	17.5	A	9.5	47 38	29.6		9.2	3	25.6	A
9.5	41 0	17.7		9.5	43 45	50.0		9.5	40 19	33.0	R	9.1	43	19.2		9.2	34	58.5	
7.8	55	7.4	A	9.2	47	53.0	B	9.4	41 17	55.8		7.7	49 7	41.4	A	9.2	41	30.1	A
9.5	43 39	15.7		9.5	44 23	56.4		9.5	38	31.7		7.8	42	2.1	A	9.1	54	13.8	A
9.5	45 28	14.7		9.1	45 3	19.3		8.7	44 17	58.4	A	9.1	50 2	16.3		8.4	59 21	33.5	A
9.3	46 16	39.8		8.7	22	29.7	A	9.5	45 30	44.1		9.2	14	12.9		9.5	30	31.0	
7.3	50	59.6	A	9.3	46 46	8.1		8.2	41	43.0	G	9.2	20	9.9		9.2	37	49.3	
9.0	54	28.0	A	9.5	47	40.0		9.4	50 9	35.6		9.2	52 22	6.0	A	9.3	13 1 40	28.7	
7.2	56	54.0	A	8.2	47 7	9.1	B	9.3	52 16	26.8	B	8.8	26	59.7	R	8.3	2 17	45.5	B
9.2	48 8	56.3		9.5	23	14.5		9.3	23	41.4	B	8.8	53 36	49.3	R	7.7	29	28.0	B
9.3	17	49.5		9.3	48 53	36.4	B	9.3	53 23	56.9		9.0	55 42	18.3	R	8.5	3 1	56.6	A
8.8	50 31	48.6	A	9.5	49 19	35.2		9.0	25	54.5	A	9.5	57 1	27.1		9.4	4 11	17.4	
9.5	52 47	30.4		9.5	24	56.1		9.4	51	32.7		9.1	15	55.7		6.4	13	1.1	A
9.5	53 3	43.2		9.0	58	40.4	A	8.7	54 25	44.2	B	8.5	16	47.7	A	7.5	5 54	55.9	A
9.1	31	19.6		9.5	51 31	40.5		9.0	30	44.0	A	9.4	36	47.3		9.5	6 50	57.7	
8.4	54 19	24.5		9.4	45	49.9		8.8	52	4.2		6.0	58 20	44.7	A	9.5	7 16	1.2	
8.6	24	36.3	B	8.8	51	8.0	A	8.7	56 39	22.8	A	9.0	12 0 6	31.0	R	9.5	8 2	5.0	
9.0	56 13	29.4		9.5	52 37	37.6		9.2	41	59.1		8.9	2 9	47.2	A	9.5	9 40	49.8	
9.1	28	40.7		7.0	55	16.0	B	9.5	58 24	57.3		9.4	3 17	54.5		8.8	56	59.2	
7.7	57 32	49.5	A	8.1	54 54	46.3	B	9.5	59 50	55.1	B	9.3	6 36	40.3	R	8.3	10 57	49.8	A
8.6	39	55.3	A	9.5	55 35	20.4		8.3	11 0 17	17.5	A	9.3	10 40	14.3		9.0	11 6	12.8	A
7.8	58 33	1.8	B	9.5	57 40	28.7		7.8	51	45.5	A	9.1	50	59.7		9.5	13 4	49.2	
9.2	59 44	19.5		6.5	59 53	37.8	B	8.8	3 26	42.4	A	9.2	11 18	3.0	R	9.5	14 11	50.3	
9.0	9 0 5	39.5	A	8.9	10 2 24	0.2	A	7.5	5 17	3.2	A	9.4	23	28.8	B	9.1	55	20.7	
9.3	44	57.5		9.4	3 52	49.4		9.3	6 51	8.6		9.5	12 34	20.0		9.2	15 13	8.5	
9.2	51	54.2		9.4	4 48	51.5		8.8	9 8	2.6	A	7.0	41	9.9		9.5	16 56	20.2	
9.5	1 6	40.0		9.5	6 30	37.5		9.4	11	19.1	B	9.4	42	17.3	B	9.5	58	39.0	
8.0	57	21.3	A	9.3	58	12.5		9.4	11 45	14.2		9.3	14 39	46.8	B	7.5	18 17	33.0	A
8.8	2 22	46.4	A	9.5	8 4	59.7		8.0	59	9.1	A	9.1	51	8.5		9.4	38	27.2	
9.2	3 59	24.7	A	9.4	9 4	32.1	A	9.2	12 2	3.7	R	7.3	16 33	50.2	A	8.5	19 46	13.3	A
9.2	7 13	33.1	A	9.5	10 11	59.5	B	9.5	2	12.2		9.5	17 45	18.5		8.0	20 3	52.2	A
8.0	15	27.2	A	9.2	12 15	42.5		9.4	21	9.4		9.3	18 0	21.0	B	9.0	21 34	28.6	A
7.8	8 40	7.1	A	8.8	13 33	59.8		9.3	13 48	54.3	R	9.5	22 46	7.2		7.5	47	45.7	A
9.0	11 5	27.5		9.5	14 35	34.3		7.8	14 44	29.2	A	8.9	23 23	38.7	A	9.5	23 57	19.1	
8.5	57	47.9	A	9.0	38	24.5		9.3	15 8	33.2	A	9.4	24 52	18.5	R	9.1	29 4	16.0	B
9.5	12 42	42.4		9.2	16 30	5.3	R	8.5	17 42	17.0	A	9.5	25 21	59.9		9.5	37	6.8	
9.2	13 14	3.6	A	9.5	18 1	54.9		8.0	18 28	53.9	A	9.5	26 27	28.3		8.8	30 36	38.7	A
9.2	30	2.6	A	7.5	18	38.2	R	9.3	19 16	9.6	B	9.2	28 45	27.3	A	9.1	57	55.4	A
9.0	16 50	4.1	A	9.4	19 15	18.6		9.3	41	2.6		9.1	45	44.9	B	9.2	31 32	12.6	
9.3	18 42	14.9		9.3	21 17	58.2		9.3	21 29	54.1	R	9.1	34 7	34.1	A	9.5	32 35	5.3	
9.3	19 36	15.4		9.5	46	19.4		8.6	22 39	21.3	B	9.1	48	44.9	A	9.5	34 28	23.4	
3.5	20 5	40.5	A	9.5	22 26	25.3		9.5	57	56.4		9.5	35 2	59.4		9.2	35 2	54.4	A
9.0	50	20.3	A	9.3	39	56.1		8.9	23 36	18.3	A	6.5	14	31.7	A	9.5	37 58	10.8	
9.5	52	29.7		9.2	23 2	52.6	B	9.5	54	41.2		9.4	36 27	7.7		8.8	38 2	12.3	B
8.2	22 28	28.8	F	9.4	8	50.1		9.4	24 1	8.1	R	9.2	52	47.3	B	9.1	39 27	28.3	
9.4	23 51	11.4		9.0	16	36.2	R	9.4	33	6.9		9.5	37 29	31.2		9.5	40 20	32.3	
9.4	24 0	49.8		9.2	47	48.4		9.4	27 3	0.8	B	9.4	38 1	4.7		9.5	41 30	54.2	
7.4	25 4	25.9	B	8.5	24 19	8.7	A	9.0	15	26.1	A	9.1	40 0	38.7	B	9.1	42 23	54.9	A
9.4	12	27.1	A	9.3	25 24	14.5		7.0	29 32	30.5	G	8.9	35	16.5	A	9.2	29	59.7	A
9.0	26 55	28.2		9.4	26 16	1.3	A	9.5	31 48	0.6	B	9.5	56	26.5	B	9.1	31	27.8	
9.4	28 15	2.6	R	9.2	28 54	18.9	R	6.8	32 19	12.4	A	6.0	41 7	33.7	A	8.0	44 10	35.2	A
8.0	30 19	21.7	A	9.4	30 24	38.0		9.5	33 10	38.8	B	9.0	42 53	50.7	A	9.5	19	24.4	
9.5	25	5.2		9.2	31 8	55.1	A	8.8	34 43	22.6	R	9.2	44 11	32.5		7.8	45 13	31.3	A
9.0	31 59	22.7		9.3	32 3	5.7		9.0	35 35	33.3	R	7.5	45	46.3	A	9.5	46 15	20.0	
7.5	32 6	35.1	A	8.3	45	47.5	A	9.1	38 29	50.8		8.5	47 29	23.2	A	9.5	59	21.5	
8.0	33 24	3.1	A	9.5	35 23	43.5		9.5	45 3	8.4	B	8.8	49 19	45.8	A	9.0	48 57	4.8	
9.5	34 43	18.9		9.2	35	28.7	R	9.5	13	7.2		9.3	48	24.2	A	9.0	49 12	10.7	

1101—1160							
	13ᵘ—14ᵘ			+63°			
m	ᵘ	′	″	′			
9.0	13	50	5	37.0		B	
7.0			15	5.8		A	
7.7		51	25	51.9		A	
8.8			58	17.6		A	
7.3		52	43	30.8		A	
9.5		54	20	53.4			
9.2			37	36.2			
9.5		55	34	6.8			
7.8		56	54	17.6		A	
9.4		58	37	11.2		B	
9.5			58	11.5			
9.5		59	7	6.5			
9.4	14	0	0	48.0			
9.4		2	34	12.3		B	
8.7		3	18	44.9		B	
9.0			46	30.6		A	
8.5		6	2	37.3		A	
9.4			10	37.3			
9.4			12	10.1			
8.0			50	12.4		B	
7.5		9	24	22.5		A	
9.0		11	9	56.7		A	
8.0		12	38	44.6		A	
9.2		13	54	21.5			
8.5			58	26.5		A	
8.9		14	20	2.8		B	
9.2		16	20	54.0		B	
8.2			28	52.5		B	
9.5		18	50	1.4			
8.5		20	58	32.9		A	
7.2		21	13	35.8		A	
8.0		23	16	9.3		A	
9.5			47	36.3			
9.3		24	40	15.0		A	
9.1		25	16	58.3		A	
6.2		27	20	49.5		G	
8.5		28	22	57.8		B	
9.2		29	9	5.9			
8.9		30	5	56.7		A	
9.5			8	18.6			
7.3		31	8	50.4		A	
9.4		34	53	30.4			
9.1		36	33	55.1		A	
9.4		37	21	35.1		B	
9.5		38	10	58.0			
8.8		39	53	1.9			
7.8		40	19	10.6		B	
8.1		41	9	42.8		B	
9.1			47	45.0			
9.1		44	9	18.0			
9.4		46	33	8.6		A	
9.5		47	30	48.8			
9.2			41	14.0		A	
7.0			47	21.3		A	
9.0		48	42	41.0		B	
9.0			52	42.2		A	
9.3		50	14	58.9			
9.5			34	29.2			
9.0		51	35	25.8		A	
9.5		52	13	27.9			

1161—1220					
	14ᵘ—15ᵘ			+63°	
m	ᵘ	′	″	′	
9.2	14	53	44	20.9	A
9.0		55	5	6.7	A
9.0			47	9.0	A
7.5		57	19	29.2	A
9.2		59	10	49.4	
9.3	15	0	31	14.0	
6.7		5	5	39.6	A
9.5			10	30.6	
9.4			23	45.9	
9.4			58	30.2	
9.1		6	17	45.1	
9.5			50	55.8	
9.5		7	17	20.1	
9.5			58	47.0	
8.3		8	50	52.0	A
8.5		10	8	12.2	
9.5			19	38.2	
8.4		11	29	56.4	B
9.3			54	9.1	A
9.5		12	13	59.9	
8.5		13	39	2.7	A
6.7		14	39	18.5	A
9.2			47	41.9	A
9.3		15	30	6.4	B
8.3		16	19	40.9	A
9.5		18	12	22.1	
9.5			19	0.7	
9.5			24	7.2	
9.3			28	20.3	B
9.0			54	28.3	A
9.5		19	13	47.0	
6.0		20	14	51.9	A
9.5			15	27.8	
7.0			33	38.5	A
8.3		21	19	27.3	A
9.5		22	23	52.8	
9.5		24	28	25.3	
9.0		25	24	5.2	A
9.2			52	22.0	B
9.5		27	20	50.8	
9.5			23	30.2	
8.9			34	11.0	A
9.3		28	27	28.3	
9.3			41	7.2	
9.5			41	57.9	
9.2			52	23.8	A
9.4		29	26	35.2	
9.1			36	25.8	A
9.5		31	4	46.5	
9.3			17	25.8	
9.5			51	48.4	
9.4		32	26	39.0	
9.5		33	6	20.8	
9.1			13	27.0	B
9.3		34	0	22.2	
9.0		35	3	17.5	A
9.5		37	3	9.3	
9.0			8	47.1	
9.4		39	27	15.0	
9.1			47	48.7	

1221—1280					
	15ᵘ—16ᵘ			+63°	
m	ᵘ	′	″	′	
9.2	15	41	26	56.6	
8.5		42	47	18.9	A
9.5		43	36	42.5	
9.5		44	1	18.6	
5.8			28	2.9	A
9.2			29	25.8	
9.5		45	32	18.2	
7.8		47	6	35.7	A
9.2			30	7.2	A
9.5		48	17	8.8	
9.1			39	22.8	A
9.5		51	35	21.8	
9.5		54	23	50.7	
9.2		55	27	48.4	A
9.0		56	12	35.7	
9.3			16	55.5	
9.2			49	45.3	B
9.3		57	5	46.6	
9.5			22	57.7	
9.5			31	16.8	
9.0			49	11.0	A
9.5		58	2	2.6	
9.0			16	33.0	B
9.5			26	42.5	
8.9		59	42	25.2	
9.3	16	0	38	12.7	B
9.5		1	1	48.9	
8.7		2	57	32.3	
9.4		3	30	27.4	
8.8			59	51.5	A
8.3		5	16	6.9	A
9.5		7	15	12.7	A
6.3			44	47.2	A
9.1		10	14	39.7	A
9.0			30	46.1	A
9.3			43	28.0	A
9.2		11	20	39.7	A
9.3			24	36.4	
8.9		12	22	53.7	A
9.2		13	15	36.4	
8.8		15	15	23.0	
8.5		16	26	18.2	
9.5			56	38.2	
9.1		17	17	33.0	B
9.2		18	28	17.2	
8.6			38	33.6	B
9.5		20	31	40.7	
9.5			35	16.7	
9.0		21	29	28.4	
8.8			43	28.0	A
9.3		23	42	15.2	A
8.9		24	5	53.4	A
9.5			53	35.9	
9.1		26	59	17.7	B
8.4		28	19	6.9	
9.3			31	38.2	
9.3			43	15.2	
7.5		29	6	53.0	A
9.4			28	38.2	
9.5			36	50.4	B

1281—1340					
	16ᵘ—17ᵘ			+63°	
m	ᵘ	′	″	′	
6.8	16	31	9	8.4	A
9.4			40	37.4	
8.0			44	41.7	
7.7		33	12	34.3	A
9.3			28	28.4	A
8.3			49	16.2	A
9.1		34	50	31.3	A
9.5		35	22	53.0	
6.5			27	22.5	A
9.5		36	51	28.4	
9.5		37	16	58.9	
9.4		38	10	58.3	
9.5		39	12	21.5	
9.3		40	45	34.9	
9.5			55	17.8	
9.1		41	29	35.0	
9.1			30	27.6	
9.5			47	47.3	
8.0			49	8.9	
9.5			51	33.0	
9.1		44	47	27.4	A
9.2			50	4.9	A
8.0		45	22	2.0	A
7.7			38	38.3	A
9.3			46	7.5	
9.3			55	5.5	
6.8		46	5	45.8	A
7.8		49	19	23.6	A
9.4		51	1	56.1	
8.3			9	23.1	A
9.5			43	39.3	A
8.2		52	29	19.7	A
8.5		54	3	46.3	A
8.9			44	38.0	A
9.5		57	31	42.3	
9.4			43	49.3	A
9.5		58	50	10.4	
9.5		59	46	35.4	
9.5			58	36.2	
9.5	17	0	1	37.0	B
9.5		1	40	23.6	
9.5		2	46	8.9	
9.5			47	28.6	
9.5		3	23	23.1	B
9.5		4	51	52.2	
7.5		6	29	37.5	
8.6		7	12	17.6	B
9.5			13	20.1	
9.4		8	27	28.5	A
9.5			59	0.2	
9.4		9	31	40.2	A
8.5		10	3	39.3	A
9.4			25	58.3	
8.2			47	17.8	A
7.8		11	17	31.4	A
5.8			18	3.0	A
9.5		12	9	9.9	
7.5		13	27	31.4	A
8.8			42	31.4	A
9.0		15	31	45.1	A

1341—1400					
	17ᵘ—18ᵘ			+63°	
m	ᵘ	′	″	′	
9.5	17	16	3	22.6	
9.3			26	25.1	
7.3		17	58	52.7	J
8.5		18	50	25.1	R
9.5		20	53	32.5	
9.4		21	16	53.7	A
9.3			49	35.7	B
9.5			51	33.7	
9.0			52	14.8	A
8.5		22	1	34.5	B
9.5			14	1.5	
9.1			50	54.1	A
9.5			55	20.9	
8.7			55	27.1	A
9.3		25	6	17.8	A
9.2		27	21	9.9	A
8.5		28	25	59.6	L
7.5			53	58.7	L
9.2		29	25	29.6	
7.2			27	52.4	L
9.3		33	36	56.1	
9.0		34	38	18.5	B
7.8		35	28	25.2	L
9.1		36	21	57.1	A
9.5			40	27.7	
9.4			50	30.0	
9.3		37	40	24.0	A
9.2			40	41.8	A
9.5		38	13	0.1	
8.5		39	11	27.2	A
6.9			25	44.7	A
9.5		40	11	43.4	
9.5		43	8	30.1	
9.5			50	26.2	
9.5		44	33	24.2	
9.3		46	9	20.7	
7.3			10	9.2	L
9.1			15	20.8	B
9.1		47	53	12.1	A
8.5		48	2	•5.3	A
8.5		49	48	10.6	A
9.0		50	31	14.1	A
8.3			35	50.3	A
9.3		51	6	11.6	A
8.3			31	10.6	A
9.3			42	4.9	B
9.4			57	4.7	B
7.5		52	20	5.3	A
9.4		53	13	25.4	
9.2			42	56.9	A
9.2			55	20.9	A
9.5		54	21	1.2	B
9.0			49	33.8	A
9.5		57	52	35.8	
8.3			58	50.0	A
7.7		58	16	57.5	A
9.4		59	4	24.4	
9.5			11	0.4	
6.8			20	32.3	A
9.5	18	1	1	50.9	

1401—1460					1461—1520					1521—1580					1581—1640					1641—1700				
	18ᵘ		+63°			18ᵘ—19ᵘ		+63°			19ᵘ		+63°			19ᵘ—20ᵘ		+63°			20ᵘ—21ᵘ		+63°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.5	18	1 9	54.4		7.5	18	45 36	6.5	A	9.0	19	23 51	32.0	A	9.3	19	55 30	32.9	B	9.2	20	35 5	38.8	A
8.6		32	36.7	A	8.8		47 56	19.5	B	9.0		56	7.1		9.0		56 3	3.0		8.3		52	44.1	A
9.0		2 10	6.3		9.3		48 30	31.6		9.5		56	6.0		8.3		25	36.8	A	9.3		36 0	28.5	B
7.3		3 42	47.0	A	9.3		49 25	3.5	B	9.0		24 34	46.8		6.5		40	9.3	A	8.5		17	22.5	A
9.0		4 42	38.1		9.5		35	2.5		9.2		40	36.0		8.1		58 2	23.0	A	8.8		36	59.2	
9.0		5 25	34.5		9.5		50 29	42.4		8.5		26 1	24.7		9.4		46	45.6		9.3		36	36.8	
9.1		6 40	38.2	J	8.0		57	1.2	A	8.8		27 4	16.9		9.4		59 13	13.1		8.0		37 51	41.7	A
8.6		46	52.9	L	9.5		51 15	12.0		8.8		28 34	21.7		9.5		47	8.4		9.1		38 0	3.8	A
9.2		7 19	2.3	A	9.5		55 59	2.8		8.8		29 22	45.3		9.0		50	15.1	B	9.3		40	44.2	
9.5		27	48.9		9.1		56 1	54.0		8.5		22	19.3		9.5	20	0 55	54.3		9.1		39 44	35.1	B
9.0		32	20.4		8.5		9	36.8		7.9		31	0.4	A	8.5		1 29	25.9	A	9.2		40 34	36.1	
9.1		8 18	38.7		7.6		57 15	13.8	B	9.0		35	0.4	A	9.3		30	6.8	A	9.3		41 4	21.3	B
9.3		9 21	42.0		9.0		58 0	49.3		7.5		39	0.2	A	6.5		2 55	28.9	A	9.3		26	17.1	A
9.3		11 0	16.6	A	8.9		10	16.6		7.5		30 6	58.9	S	9.0		3 22	21.1	A	9.2		47	0.4	B
8.6		55	33.7	A	8.9		24	29.7	B	9.5		23	20.3		8.6		38	16.9	B	8.3		42 39	0.7	A
9.0		12 2	18.5	A	8.8		28	8.6		9.5		32 11	21.8		9.5		4 37	45.1		9.5		51	12.0	
9.0		14 25	29.2		9.0		59	51.5		9.2		20	10.5		7.5		53	16.7	A	9.5		57	30.5	
8.8		15 17	52.4		9.5		59 34	30.6		8.8		32	32.0		9.1		5 16	5.3	A	9.5		43 26	30.7	
9.5		53	56.9		8.8		46	17.3		6.3		33 16	6.1	G	8.2		17	2.0	A	9.5		44 4	38.6	
9.5		19 18	19.9		8.9	19	0 11	32.0		8.5		29	9.7	R	9.5		6 4	52.9		7.8		19	27.2	A
9.5		20 40	21.9		9.5		33	13.0		9.5		34 56	1.9		8.6		7 17	38.3	A	9.5		46 29	13.0	
9.5		57	53.5		9.5		1 28	33.0		8.5		35 34	31.2	S	9.3		22	41.2		8.6		30	53.7	A
9.5		21 42	42.0	B	8.3		2 17	7.6	A	9.3		55	44.3	B	9.0		45	55.9		6.5		47	29.8	F
9.4		22 33	59.8		9.4		3 53	20.2		8.0		36 9	24.1	B	9.0		8 6	8.8	A	9.4		51	58.0	
9.5		24 51	29.8		9.5		6 6	8.6		7.8		12	42.6	A	7.8		9 38	5.8	A	9.3		47 15	18.5	
9.0		25 25	58.1		9.5		9	1.2		9.4		34	18.3		9.4		11 20	4.6	B	8.6		44	21.5	
9.0		27 19	4.5	A	9.4		30	1.2		9.3		52	57.2	B	9.5		38	37.8	B	8.1		50	18.1	B
9.4		23	2.7	B	8.8		42	23.1		9.4		54	52.3		8.7		13 23	44.6	R	9.5		48 11	58.5	A
9.4		30	8.4		9.0		7 17	51.7		8.5		37 3	8.9	B	9.4		35	40.2		8.5		49 1	14.4	B
9.5		28 48	20.2		9.1		59	5.0		9.0		6	6.9		9.5		14 52	31.8		9.5		20	5.8	
8.5		29 1	10.0	A	9.5		8 35	48.3		9.4		16	47.5		9.5		15 41	37.0		9.5		50 3	56.8	
9.0		30 29	53.7		8.8		9 0	9.2		9.5		20	42.1		9.5		44	15.7		8.6		45	40.6	B
9.5		31 19	11.5		9.2		32	55.7		8.3		38 27	34.7	A	8.0		16 1	38.8	B	9.2		50	15.1	
8.5		55	35.5	S	9.1		42	14.6		8.9		34	41.0	B	8.5		17 0	5.4	R	9.0		51 6	10.2	
9.1		33 44	9.0		8.6		43	22.6	B	9.3		49	40.8	B	9.2		48	55.6		9.5		59	18.6	
8.8		44	20.7	A	9.0		51	59.0		8.8		41 5	41.2	A	9.4		18 10	18.5		9.5		52 31	10.7	
9.1		52	16.8	A	9.2		10 32	42.4		9.0		31	1.4	A	8.0		42	35.8	R	7.7		53 18	57.2	
9.3		34 6	44.2		9.4		46	17.5		8.9		42	58.3		5.9		19 9	31.8	R	9.3		25	9.2	B
8.0		11	34.6	A	8.8		11 3	22.3		9.3		43 42	55.6	B	8.5		35	43.2		9.5		54 4	38.2	
9.3		35 9	45.3		8.7		40	55.7	B	9.4		44 1	59.6		9.0		44	42.2		9.4		45	7.7	
8.0		27	13.0	A	9.4		13 47	38.5	B	7.5		25	9.3	A	8.6		20 51	43.7	A	9.5		46	3.0	
9.5		36 37	57.0		9.4		51	37.4		9.0		45 43	33.8	A	9.4		21 1	28.5		9.5		55 8	28.4	
8.6		43	33.9	B	9.4		14 23	21.2	B	8.0		46 4	40.2	A	8.0		21	43.3	B	9.5		56 13	18.0	
9.5		37 4	41.9		8.0		41	8.0	A	7.5		12	29.9	A	9.4		26	46.3		9.5		29	51.9	
7.3		24	23.7	A	9.5		53	17.8		9.5		47 22	59.3		9.0		22 55	2.4	A	9.5		57 55	5.4	
8.4		38 20	39.4	G	9.5		58	17.7	B	9.4		38	13.1		9.5		23 17	9.4		7.8		58 46	6.9	B
9.2		39 14	19.3		9.0		15 6	9.9		9.0		48 12	53.4		9.5		20	59.6		9.2		56	30.8	
9.0		53	28.1		8.8		26	49.3		9.2		49 11	5.1	B	9.4		24 23	23.5		9.5		59 1	12.9	
9.5		40 8	2.2		9.3		16 1	57.6		9.3		26	36.8		9.5		25 9	32.3		9.5	21	0 30	51.5	
9.3		19	37.2		9.0		17 31	39.9		8.5		30	12.1	B	9.3		26 55	32.3	R	8.8		1 18	0.6	
8.8		24	19.0	A	8.8		53	58.3	J	9.2		50 34	57.5		9.2		27 32	32.2	R	8.8		21	23.4	
9.0		41 12	21.3	A	9.3		59	15.4		9.0		59	15.6		9.2		29 13	24.4	R	9.0		24	15.1	B
9.5		22	6.6		9.0		18 3	31.6		9.5		51 6	21.5		8.5		30 55	17.5	B	9.5		36	11.6	
9.5		49	46.3		9.4		13	59.4		7.0		14	47.6	S	8.8		32 40	44.1	A	9.1		2 34	57.7	A
8.8		42 14	15.9	A	9.1		19 7	46.7	B	8.5		21	30.0		9.3		33 26	52.0		9.5		3 12	33.2	
9.4		43 4	18.3		7.4		32	48.2	A	9.1		52 57	44.6		9.4		30	13.3		9.5		39	6.8	
9.4		23	10.0	B	9.0		35	56.0		8.5		53 22	4.0	B	9.1		35	45.8	B	7.9		55	11.7	B
9.3		44 10	52.2	A	9.5		20 47	28.7		8.9		35	8.0		9.4		34 41	59.7		8.3		4 49	55.2	A
9.1		17	39.0	B	9.1		22 14	12.6		9.2		56	23.5	B	9.0		50	1.5		9.5		6 25	12.0	
8.8		35	54.0		9.5		23 11	23.3		9.4		54 59	22.7		8.0		54	51.5	A	8.0		7 10	4.0	A

1701—1760				1761—1820				1821—1880				1881—1940				1941—2000			
	21ᵘ	+63°			21ᵘ—22ᵘ	+63°			22ᵘ	+63°			22ᵘ—23ᵘ	+63°			23ᵘ	+63°	
m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′		m	ᵘ ′ ″	′	
9.5	21 7 15	57.0		8.7	21 37 58	47.1	B	9.5	22 8 23	36.8		9.0	22 38 53	20.1		6.8	23 4 29	44.8	B
9.5	8 3	0.4		9.2	38 44	43.0		9.5	11 8	5.2		7.8	54	49.3	B	8.8	46	26.1	A
7.8	35	11.6	A	8.5	51	50.3	B	8.3	25	30.2	A	9.5	39 24	3.0		8.9	5 1	51.0	A
7.8	38	36.9	A	7.0	39 0	3.2	A	9.4	12 4	46.2		9.5	56	59.3		9.5	37	1.3	
8.5	51	30.3	A	9.1	5	48.3		9.1	5	53.9		9.5	40 20	9.9		9.4	45	57.1	
8.5	9 41	41.1	A	8.5	9	58.9	A	8.4	35	56.9		9.0	41 40	25.0		9.4	47	36.7	B
9.5	10 33	35.7		9.4	25	31.2	A	9.5	52	37.3		9.4	53	28.6		9.5	59	32.2	
6.4	48	48.5	A	8.0	27	33.3	A	8.0	57	59.3	B	9.0	42 24	35.0		9.5	6 4	11.9	
8.5	48	8.6	A	8.6	40 10	58.5	A	9.5	13 21	14.5		9.5	43 27	0.5		7.0	5	55.9	B
9.4	11 9	23.4		9.4	41 15	30.6		8.8	22	23.3	A	8.6	44 33	13.8	A	9.4	47	19.7	
7.8	55	52.8	A	9.5	30	50.6		8.7	14 0	58.4	A	9.5	59	25.6		9.4	58	38.5	
8.3	12 58	56.2	A	9.5	42 10	20.3		9.5	45	9.8		8.9	45 29	35.9	A	9.1	7 26	45.3	
9.5	14 8	13.3	B	9.4	57	44.0		9.4	15 0	51.4		8.6	32	47.7	A	9.3	58	3.1	
9.5	15 21	51.4		9.5	44 56	32.6		9.5	27	21.4		9.0	33	35.4	B	9.5	8 44	25.6	
9.1	41	1.4		9.4	45 24	19.3		9.5	53	48.6		9.5	50	32.1		7.0	9 27	29.1	A
9.3	16 12	3.3		9.5	30	58.6		9.1	16 2	23.8		9.4	46 11	7.0		9.4	37	57.9	B
9.5	21	34.7		9.4	46 11	17.4		9.5	16	36.2		9.5	12	56.8		9.0	41	35.5	
9.3	17 12	4.2		9.3	55	54.8		9.5	27	4.9		9.5	56	11.7		8.0	45	19.8	A
9.1	38	30.2		8.0	47 15	19.3	S	8.8	41	5.2	B	9.4	47 26	25.0		9.5	54	56.1	
7.3	18 35	44.5	A	9.0	16	36.1		8.3	17 33	33.7	B	8.8	48 17	37.4	A	7.0	10 19	19.7	A
7.7	19 26	37.2	A	9.5	20	31.1		9.3	41	35.9	B	8.7	19	39.8	A	9.5	44	41.3	
8.7	38	16.8	B	9.5	48 10	4.6		8.7	44	10.8		9.5	38	53.2		8.3	55	0.1	A
9.5	52	19.6		9.5	42	23.2		9.5	18 51	34.1		9.1	39	20.2		9.5	11 11	10.3	
9.5	20 9	49.0		8.0	49 52	2.6	P	9.5	20 24	31.3		8.2	52	20.6	F	8.3	13	19.7	A
9.0	40	15.6		9.4	50 55	29.2		9.2	47	4.3		9.5	49 19	34.0		8.5	37	57.0	R
9.0	47	47.7	A	9.5	51 20	24.7		9.3	21 4	56.8	B	9.5	55	51.5		8.0	42	17.3	A
9.1	21 18	41.7	B	9.5	23	38.0		9.2	16	28.8	R	9.0	50 50	41.8		8.2	52	20.1	A
9.0	28	37.7	A	9.2	52 3	0.2		9.5	32	28.8		9.5	51 37	22.5		9.5	12 12	40.8	
8.9	39	44.7	A	9.3	39	36.1		8.9	40	42.0		9.5	52 48	8.6	B	9.5	32	6.1	
8.5	23 9	38.1	A	9.4	53 5	14.9		7.8	22 31	12.6	A	9.5	59	34.9		9.5	47	39.4	
9.1	10	54.0		9.4	37	53.2		8.3	23 5	12.1	A	9.5	54 0	3.3		9.5	13 34	30.0	
7.8	37	46.5	A	9.0	54 42	51.7	A	6.5	31	20.3	A	9.5	32	20.1		9.5	14 0	49.4	
8.5	24 13	58.3		9.1	45	57.2		9.4	37	15.8		9.5	44	29.0		9.5	35	22.1	
9.0	30	59.4		8.8	59	18.4		9.5	54	48.7		9.4	55 18	37.0		7.0	15 2	56.7	A
7.7	32	21.5	A	9.5	55 4	17.4		9.0	24 24	47.7	A	8.8	56 13	1.4	B	8.3	13	21.6	A
9.1	34	30.3	A	9.5	56 35	35.5		9.5	25 32	58.2		9.2	19	1.1		9.4	21	9.4	
8.8	38	45.0	A	9.2	57	40.4		7.5	26 24	4.4	B	7.5	42	26.0	G	9.5	26	28.1	
8.6	43	58.9	B	9.5	58 0	7.0		9.3	42	9.7		9.1	57 0	20.7	B	7.5	51	42.6	A
9.2	25 10	51.6		9.5	16	44.3	B	9.5	27 12	50.7		9.5	5	52.3	B	9.5	55	22.6	
8.4	26 40	39.2	A	8.5	48	24.7		9.5	19	39.8		8.9	10	27.2	B	8.6	55	4.5	B
7.5	27 13	39.6	A	9.5	59 3	46.3		9.4	26	37.6	B	9.5	16	49.8		9.5	16 31	54.0	
9.5	26	31.7		4.5	36	54.9	A	9.5	32	22.0		8.9	16	25.9	B	8.9	33	5.0	B
9.5	28 48	6.9		9.3	22 0 56	9.6		7.8	28 6	9.3	A	8.6	55	58.8	A	9.5	41	33.5	
9.5	29 7	10.7		9.5	1 20	39.6	B	9.4	29 4	55.8		9.1	58 16	29.2		9.3	17 34	53.2	
9.5	37	29.2		9.5	25	12.0		9.5	27	21.5		6.8	59 2	18.7	A	9.2	37	44.0	
8.9	39	3.2	B	9.4	2 15	3.5		8.2	29	4.2	B	9.4	11	7.0		9.3	18 8	23.6	
6.8	30 37	5.9	F	8.5	3 39	1.6	B	9.0	30 19	37.8	B	9.1	44	29.0	A	9.3	10	16.7	
7.7	41	21.5	B	8.6	42	39.2		8.1	54	50.3	B	7.8	23 0 11	30.9	A	7.0	18	3.1	A
9.3	49	1.4	B	9.0	43	21.4		9.1	31 35	9.4		8.8	56	33.9	A	8.3	42	44.8	
9.3	31 23	13.0		9.1	49	20.8		9.5	37	47.8		9.4	1 39	25.4		9.5	19 2	36.0	
9.5	49	47.0		9.5	4 3	43.1		9.1	32 28	15.3	A	6.3	2 4	25.3	A	9.5	21	53.6	
8.4	32 12	37.7		8.2	12	26.8	F	6.7	34	0.1	A	9.2	19	57.7		9.2	20 0	6.1	
7.2	38	5.4	F	9.5	21	56.5		9.1	33 25	46.7		9.3	27	59.8		7.4	14	30.0	R
8.5	33 8	52.9		9.0	5 0	23.3	A	8.8	31	31.0		9.2	33	18.6	A	9.0	25	49.2	
8.5	35	19.5		7.2	22	24.8	A	9.5	34 11	52.6		9.3	43	51.1		8.5	30	26.2	
9.5	48	58.2		9.5	40	53.0		9.5	35 40	4.1		9.0	53	50.6	B	8.3	[illegible]		
9.4	34 3	13.6		9.2	6 6	3.5		9.5	51	6.1		9.5	3 15	48.8		9.5	21		
9.5	35	32.2		8.4	7	38.8	A	9.2	37 9	38.5		7.8	15	13.3	A	7.0			
7.0	35 8	43.8	B	8.4	7 6	16.5	A	9.1	44	43.8		9.2	38	49.2		9.5			
9.5	36 53	42.0		7.8	46	0.3	A	9.5	38 41	24.5		9.5	58	53.7		9.5			

2001—2022				2023—2044				2045—2066				2067—2088				2089—2109			
	23u	+63°			23u	+63°			23u	+63°			23u	+63°			23u	+63°	
m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′	
9.3	23 22 26	38.0		9.5	23 30 29	55.8		9.5	23 37 48	9.5		9.5	23 45 4	38.5		9.1	23 52 35	11.8	
9.4	40	47.8		9.3	31 0	30.0		9.0	58	44.6		9.5	7	19.9		9.5	54	17.8	
9.4	23 56	8.0		9.5	21	58.0		8.3	38 20	5.4		8.8	40	29.6	A	9.5	53 11	48.5	
6.9	24 5	36.5	F	8.9	39	32.5		9.5	29	13.3		9.5	46 10	30.6		9.4	54 6	12.4	
9.5	9	50.3		9.4	32 4	31.0		9.3	32	21.8		8.8	22	35.0	A	9.1	18	48.9	
7.9	12	32.0	F	9.5	24	49.7		8.4	52	8.4		9.5	27	57.6		9.5	34	3.1	
8.3	22	12.0	B	9.5	50	49.6		7.0	39 36	29.6	F	9.5	47	28.2		9.5	55 5	43.9	
9.1	44	13.3		8.0	33 10	30.6	B	8.7	51	54.7	R	9.5	47 0	1.1		9.5	23	51.2	
9.0	25 52	27.7	B	8.9	11	20.5		9.4	52	56.2		9.2	55	4.9		9.5	25	12.8	
9.4	26 0	18.7		9.0	20	1.9		7.2	40 25	19.8	R	8.5	48 52	22.7		9.5	51	32.1	R
8.0	2	20.0	B	8.0	48	15.8	A	7.8	41 7	0.4	G	9.3	53	43.3		9.5	56 34	26.8	
9.3	33	28.6		9.2	34 35	52.7		9.2	29	47.9	R	9.5	49 4	8.3		9.5	42	28.6	
9.4	42	8.1		9.0	35 10	42.5	B	9.3	55	4.2		9.0	50 23	32.6	A	9.3	45	54.3	
9.5	48	13.2		9.1	18	51.3		9.3	59	46.0		9.0	55	25.7		9.5	48	52.3	
9.4	57	40.1	B	9.5	27	26.3		9.3	42 15	26.6		9.3	58	2.7		7.7	57 27	59.1	P
9.5	27 13	34.6		6.0	32	42.7	G	9.3	19	22.7		9.3	51 29	12.7		9.3	58 5	17.4	
9.5	57	26.6		9.2	44	46.8		9.0	43 22	51.7		9.2	39	57.0		9.0	6	0.6	
9.5	28 7	34.0		9.5	36 4	23.6		9.0	24	39.2		8.9	53	1.2		9.3	28	57.3	
9.5	50	57.3		9.4	6	2.4		8.9	45	17.9		8.8	59	38.5	R	5.4	58	22.2	A
9.5	29 15	42.3		9.5	47	28.7		6.6	56	10.7	A	8.0	52 11	49.5	R	8.0	59 29	55.7	A
9.5	58	0.9		8.8	49	10.4		9.5	44 31	1.0		9.1	21	45.8	R	9.5	52	13.4	
8.0	30 7	44.2	A	8.9	37 48	46.6	B	9.4	59	48.9		9.1	34	3.6					

Zone +64°

1—20				21—40				41—60				61—80				81—100			
	0u	+64°			0u	+64°			0u	+64°			0u	+64°			0u	+64°	
m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′	
8.9	0 0 31	37.1	A	9.5	0 10 26	57.7		9.4	0 16 38	14.8		9.0	0 28 13	21.4		9.2	0 38 10	17.2	A
8.9	1 29	47.4		9.4	28	55.5		9.5	17 6	45.8		9.5	14	10.9		7.0	39 29	18.6	A
7.0	39	17.0	A	9.3	32	31.4		9.5	9	46.1		9.2	29 22	11.4		8.8	40 17	46.7	A
9.1	44	12.5	A	9.5	40	54.9		7.0	47	34.9	A	9.4	30 7	27.5		8.0	58	17.6	A
7.6	2 22	56.2	B	9.5	52	51.4		9.1	18 13	28.4	A	9.4	41	3.4		9.3	41 55	51.3	
9.4	3 16	13.4		8.8	11 12	25.0	A	9.5	18	24.0		8.5	49	42.7	A	9.5	43 16	9.5	
9.2	18	9.5		9.5	24	1.2		8.3	19 7	53.0	A	9.5	51	9.1		9.3	37	0.5	
9.3	41	40.5		9.2	25	20.6	A	9.5	20 45	42.2		8.5	32 33	19.4	B	9.3	44 37	41.4	
8.5	4 19	48.2		9.5	12 14	18.6		9.0	57	39.3		9.5	45	0.7		9.4	52	5.6	
9.5	24	11.0		9.2	29	3.9		9.2	21 17	5.9		9.0	33 53	59.6		9.5	45 14	11.8	
9.3	49	35.4		9.5	36	42.7		9.3	31	36.5		9.4	54	55.6		9.5	41	20.6	
9.4	5 7	29.0		9.4	41	12.1		8.2	22 15	28.0	A	9.3	34 21	21.1		9.4	46 6	10.2	
9.5	39	48.4		9.3	13 2	41.2		9.1	23 12	49.8		9.5	41	59.6		9.5	17	27.1	
9.5	40	31.9		9.1	4	16.0	A	9.5	24 40	25.0		9.1	35 36	13.7		9.5	21	20.0	
7.5	6 2	3.1	A	9.1	14 25	59.0		9.4	25 22	4.9		8.4	55	30.9	A	9.5	28	14.6	
9.5	36	54.3		7.5	15 17	32.9	R	9.0	37	43.2		9.2	36 16	28.4	A	9.5	48	19.2	
9.4	8 25	10.3		9.5	46	5.0		9.5	27 33	13.8		8.7	54	18.1	A	9.5	47 5	5.0	
9.5	9 4	49.8		8.5	57	37.3	A	9.4	54	16.6		9.0	37 42	50.0		9.5	9	22.2	
9.5	10 7	42.3		9.4	16 13	3.3		9.4	59	53.6		9.4	43	25.5		9.5	16	19.8	
9.5	12	49.7		9.5	17	57.8		9.5	28 3	9.1		9.5	56	58.1		9.1	23	56.7	

101—160				161—220				221—280				281—340				341—400			
	0u—1u		+64°		1u		+64°		1u		+64°		1u—2u		+64°		2u—3u		+64°
m	u ′ ″		′	m	u ′ ″		′	m	u ′ ″		′	m	u ′ ″		′	m	u ′ ″		′
9.5	0 47 30		54.1	8.8	1 15 53	A	20.1	9.0	1 31 35		41.9	8.6	1 51 15	A	6.4	9.5	2 28 1		20.5
9.5	33		22.8	9.5	16 27		9.4	9.5	38		39.1	6.0	52 9	A	11.5	9.5	31 21		5.4
9.5	57		39.4	9.5	34		13.2	9.2	32 10		8.6	9.2	53 38		46.7	9.5	33 52		47.5
9.5	48 10		30.1	9.5	17 10		8.4	9.2	47		5.3	9.5	41		33.2	9.5	35 34		28.9
9.3	30		18.3	9.3	18 40		31.0	9.5	33 36		23.4	6.5	49	A	24.1	9.5	38		41.1
9.5	34		5.3	9.2	49	A	36.9	8.9	45		14.3	9.5	54 11		36.9	8.3	48	B	4.3
8.4	51	L	36.5	9.5	19 47		39.9	9.5	48		29.3	9.5	32		36.8	9.4	36 0	B	9.4
9.5	51 2		39.4	6.5	53	A	25.1	8.5	59	A	46.7	9.5	55		3.9	9.5	5		8.6
8.4	29	L	21.6	9.5	58		49.9	9.2	34 2		25.3	9.1	55 45		44.2	9.0	37 36		4.8
9.5	52 24		38.9	9.4	20 3		52.6	9.5	37		30.3	9.5	56 6		36.6	9.3	38 9	B	54.8
9.5	28		32.5	9.4	11		53.2	8.5	35 33	A	0.7	8.2	34	B	47.2	7.2	11	A	2.0
9.2	37	B	55.8	9.0	16		6.6	9.5	42		25.3	9.5	43		47.5	9.2	39 23		11.0
9.5	44		52.7	9.4	42		40.6	9.0	36 47		42.2	9.5	44		6.9	9.2	35		26.5
9.5	44		25.1	9.1	21 13	A	56.8	9.5	59		18.0	9.5	54		22.1	7.4	41 5	L	3.8
8.8	53 36	A	19.7	9.5	22 4		54.6	9.5	37 46		1.0	7.3	57 50	A	20.3	9.1	45 13		4.5
8.0	53	A	2.6	9.2	20		18.8	8.9	38 16		39.2	9.5	58 11		7.7	8.7	54	A	28.9
9.4	54 29		14.3	9.0	26		55.4	9.5	25		41.5	9.4	23		0.6	9.1	48 43		49.0
9.5	55 28		5.3	9.3	29		9.0	9.4	30		40.3	9.5	46		34.4	9.1	49 31		10.3
9.5	31		16.8	9.1	41		49.3	9.2	32		28.7	9.5	49		30.4	9.2	33		7.4
9.5	58		31.5	9.4	45		47.0	8.5	52	A	7.3	8.2	59 5	A	38.9	8.5	33		44.5
9.5	56 58		46.6	9.2	23 0		3.3	9.5	39 21		50.9	9.1	16	A	8.9	9.0	55	A	35.2
8.9	57 36		47.7	9.3	4		51.0	9.5	34		15.7	9.0	54	A	8.3	9.1	50 45	A	14.1
9.5	59 24		27.1	9.2	12		18.1	6.6	40 49	A	7.9	9.5	2 0 36		48.1	8.3	52 44	R	35.7
9.5	24		50.1	9.4	18		14.5	9.4	53	A	8.4	9.2	41		25.4	9.5	48		4.0
8.8	1 0 10	B	14.7	9.3	21		58.9	8.9	57		44.1	9.1	2 24		44.6	8.0	51	L	57.8
9.1	1 8		15.4	9.4	26		41.6	9.5	41 28		38.9	9.5	31		26.4	7.4	53 24	L	33.7
5.9	2 21	S	13.3	9.0	24 1		12.6	9.4	34		55.7	7.0	49	A	10.2	7.7	43	A	52.3
9.2	38		32.0	9.2	6		26.4	9.5	42		17.1	9.5	51		38.7	9.1	47	B	20.4
7.4	3 18	S	13.8	9.5	25		50.2	9.5	42 46		9.1	7.5	3 53	A	20.0	9.4	54 1		30.3
8.7	4 12		50.9	9.5	25 29		40.3	9.5	47		21.2	9.5	4 28		28.9	9.3	18		6.4
9.2	35		3.6	9.1	34		17.0	9.5	54		28.9	9.4	39		15.6	9.4	55 39		34.4
9.5	51		30.1	9.4	48		23.5	9.5	43 21		50.1	7.5	5 50	A	17.0	9.5	56 26		4.9
9.0	52		57.7	9.5	26 0		26.6	9.5	36		35.9	7.0	6 17	A	34.8	9.5	53		41.9
9.5	5 57		4.7	9.1	9		43.1	9.5	52		37.9	7.2	7 0	L	54.9	9.0	58 22		28.7
9.4	6 4		17.3	9.4	20		19.0	9.4	57	B	43.7	9.3	42		44.3	7.0	41	A	20.3
9.2	30	A	32.0	8.5	20		31.9	8.6	44 0	A	4.5	9.5	8 10		6.8	8.0	59 41	A	32.0
9.4	36	B	41.5	9.5	36		49.2	9.2	9		26.3	9.5	13		10.2	9.5	3 2 17		0.4
9.1	42		53.4	9.5	45		7.6	9.5	27		1.6	9.5	52		45.4	8.5	3 19	A	22.8
9.5	46		32.3	9.4	27 18		57.6	9.5	29		4.4	8.5	54		24.4	9.4	4 17		3.8
9.5	53		5.3	8.8	19		8.1	8.8	37		13.7	9.3	9 1		54.3	8.4	42	A	34.6
9.4	7 36		9.8	9.4	29		29.7	9.5	45 31		21.2	7.0	11 8		34.1	9.3	5 3		9.7
9.5	52		8.8	6.8	42	A	0.1	9.5	35		3.5	9.5	16	B	8.6	9.1	37		59.6
9.5	8 31		11.8	7.8	56	A	47.9	8.9	37	A	48.2	9.5	43		0.9	8.5	6 12	A	21.3
7.6	9 6	B	50.4	9.5	28 27		3.9	9.5	46 2		18.1	9.5	12 7		24.5	9.5	52		38.6
9.4	7		34.8	9.0	29		23.2	9.5	2		54.5	8.9	13 17	A	5.2	8.5	9 20	A	35.4
9.4	33		59.9	9.5	41		38.0	9.5	7		13.1	9.0	14 39		34.3	9.0	27	A	29.3
9.5	46		48.8	9.4	49		39.5	9.5	42		30.1	8.5	16 30	A	49.0	8.7	33	A	46.3
9.0	10 31	B	49.4	8.9	49		46.9	7.8	55	A	41.6	8.5	17 15	A	50.9	8.7	10 8	A	39.5
9.4	42		0.1	9.5	53		17.1	8.1	47 1	A	4.3	9.5	18 39		11.6	8.3	11 48	A	42.9
8.0	11 9	A	19.5	9.5	29 25		34.3	9.5	33		47.8	9.5	19 5		41.4	9.0	12 4	A	56.1
9.3	39	A	8.2	9.5	26		36.8	9.0	57		26.1	9.2	20 5		46.6	6.0	9		
9.5	44		1.0	8.3	33	B	24.7	9.5	48 11		46.1	9.4	22 23		44.6	9.5			
9.5	12 1		2.8	9.2	49		23.4	9.5	38		43.2	8.7	23 4	B	8.8	9.5			
8.8	22		33.9	9.3	30 5		41.7	9.2	49 15		9.9	9.5	24 29		58.9	9.0			
9.3	13 15	B	38.4	8.7	19	A	3.7	9.5	35		14.2	8.5	38		50.9	9.5			
9.2	58		52.0	9.5	40		16.5	9.5	42		41.8	9.3	25 22		46.5	9.0			
9.5	14 39		43.8	8.9	41		20.3	9.2	50 1		28.9	8.2	57		42.3	9.1			
9.4	44		32.0	8.8	31 7	A	4.9	8.7	14	B	0.9	7.6	26 11		41.1	8.5			
9.2	54		39.4	8.8	9		51.9	9.1	21	A	0.3	9.4	15		53.2	9.4			
9.5	15 43		44.8	9.3	18		49.6	9.3	46		24.4	8.5	27 26		50.4	8.6			

401—460					461—520					521—580					581—640					641—700				
	3u—4u			+64°		4u—5u			+64°		5u—6u			+64°		6u—7u			+64°		7u—8u			+64°
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
8.8	3	27	31	28.2	9.5	4	21	53	2.1	9.5	5	8	28	57.6	9.4	6	9	57	27.5	9.5	7	24	54	15.1
9.0		28	16	28.7	9.4		22	20	18.8 B	9.5		9	44	22.2	9.5		11	22	56.5	9.3		25	19	3.9
9.0		29	31	20.3 A	9.5			54	38.5	7.5		10	39	33.6 A	9.5			37	43.2	9.0			49	59.4
9.4		30	42	49.8	9.5			59	11.1	9.1		12	11	31.6 B	8.8		12	17	17.2 A	9.5		27	33	47.1
8.8		31	7	8.2	9.3		23	16	41.7 B	9.4			40	11.9	9.0			33	10.7 A	9.5		28	46	30.4
8.8		33	58	10.5 L	9.5		24	16	8.4	9.2		13	14	9.7 B	9.2		14	47	16.0 B	9.2		29	15	5.5
9.4		35	48	55.6	8.7			20	57.9	9.5			27	8.7	8.2		16	21	31.7 B	9.4			36	1.5
8.7			56	17.9 L	8.5			21	33.6 B	9.3		14	16	57.8 B	9.2			34	19.8	9.5		32	40	23.9
9.3		38	42	35.7	8.0		26	39	15.4 L	9.2			21	40.3	8.6			44	57.7 A	7.1		33	32	23.4 A
9.5		39	40	41.9	8.5		28	7	48.2 B	9.3			53	10.0	8.8		18	25	7.3	9.5		34	24	32.7
9.5			56	56.2 B	9.5			24	47.4	8.8		15	16	27.2	9.0		20	33	43.1	7.8		35	25	42.6 A
8.5		40	34	16.9	9.3		29	1	33.0 A	8.2		17	31	11.5 A	8.8		22	19	5.5	9.1		36	29	32.3
9.3		41	51	27.2	8.8		31	4	46.4 A	8.8		20	35	58.5 A	7.9		24	5	51.0 A	9.5		37	30	33.8
8.3		42	43	59.0 A	9.4		32	15	32.9 A	7.7			38	56.2 A	9.3			24	40.9 B	8.0			53	26.9 A
9.3		44	5	31.2	7.2			34	32.0 A	9.5		22	42	25.7	9.2			30	54.0 B	8.5		38	17	17.6 A
9.4		45	36	42.0	9.2			36	19.8	6.7		23	15	3.0 A	8.0			54	15.8 A	9.5		41	57	13.2
9.4			41	31.6	9.3			44	0.2	9.5		26	45	49.7	8.8		25	13	43.4 A	9.5		43	42	3.7
9.5		47	11	17.4	9.5		35	16	33.6	9.2		27	30	4.5	9.1		26	39	46.7	9.2			47	7.9 B
9.5			26	24.7	9.4		36	3	4.0	9.4		28	3	15.8	9.0		28	23	49.2	8.7			57	19.6 A
9.2		48	16	49.8	9.5			35	39.7	9.2			46	1.4 A	7.9			46	13.4 B	9.2		44	21	27.9
9.5		51	47	1.3	9.1		37	2	47.8	8.9		29	29	59.0 A	9.5		32	55	3.2	8.8			29	41.2 A
9.5			49	34.9	9.2		38	6	12.9	8.8			35	39.4 A	8.5		34	29	54.5 A	9.5		45	22	58.4
9.5		52	4	0.9 B	9.5		39	49	27.2	9.5		31	9	12.8	8.3		37	1	29.8 B	9.5		46	17	38.8
8.4		53	15	37.4 A	9.5		40	15	45.1	7.3			58	40.9 A	9.3		38	31	19.3	9.5		48	38	56.9
9.4			23	49.1 B	9.5			27	49.3	9.0		32	44	41.1 A	9.5		40	0	42.3	9.3		50	20	26.0 B
8.8		57	23	6.0 A	9.5			46	25.2	9.2		35	43	31.1 A	9.5			10	9.9 A	9.5			44	23.0
9.3			39	9.2 A	8.5		42	35	9.9 A	9.5			52	23.1	9.5		41	22	42.8	8.8		51	24	28.9 A
9.5		58	37	5.7	9.5		43	5	40.4	8.8		36	8	51.6 A	8.7		43	18	41.2 A	9.5		53	52	44.6
8.0			54	33.9 A	9.4		45	7	37.6	9.5			32	4.0	8.3		44	34	47.1 A	9.5			58	29.9
9.3	4	1	56	46.4	9.5			17	38.6	9.0		38	52	55.6	9.0		45	24	50.2 A	8.9		55	15	44.1 A
9.5		3	11	59.1	9.5			19	30.5	8.7		39	21	57.1	9.3			29	11.4 A	9.5		56	22	22.5
8.5		5	13	53.2 G	9.5		47	35	39.1	9.5		40	49	45.6	9.5		48	12	50.3	8.5	8	0	5	27.4 A
6.0		7	4	47.0 A	9.4		48	20	6.3	8.5		41	13	16.2	9.0			49	8.5 A	9.3		1	3	34.8
8.6			14	31.5 A	9.2		50	1	39.5	9.1			33	17.2	9.5		49	54	44.2	8.1		3	25	9.3 A
9.5			56	9.5	9.5			40	7.9	8.7		42	43	7.2 A	9.5		50	51	32.0	9.3		4	6	31.8
9.2		9	4	18.5	9.5			58	30.6	9.5		47	33	18.7	8.2		52	36	37.6 B	8.5		6	11	0.1 A
8.1		10	7	53.5 A	9.5		52	58	14.4	8.5			57	57.4 A	9.2		53	23	49.0 B	9.4			31	9.3 A
9.2			30	48.2 A	8.8		54	10	6.6 A	9.5		48	43	59.8	8.3		54	51	35.0 A	9.1		7	7	10.4 A
9.3		11	6	2.4	8.9			40	0.6 A	9.5		49	25	49.5	9.3		55	53	16.3 B	9.5		8	6	31.4 A
9.3		13	11	33.8	6.9		55	40	42.9 A	8.3			45	4.2 A	9.3		56	27	19.8	9.5			22	9.3
9.5			29	2.4	9.5		56	45	29.2	9.5		50	24	1.0	9.1		57	13	24.6	8.3		11	49	36.7 A
9.0			33	48.8	9.5		57	58	20.1	9.5			54	41.6	9.0		58	14	14.8 A	9.5		13	21	25.4
9.5			51	50.4	8.5		58	37	6.3 A	9.0		51	8	21.5	9.1	7	0	8	5.6	8.8		15	24	23.9 A
9.2		15	2	38.9 B	8.3			55	33.0 B	7.9		52	7	4.7 B	9.4		1	15	27.1 A	9.4		17	3	37.2 B
9.5			9	31.2	8.0		59	37	45.4 A	9.4		54	4	14.2 A	9.3		3	16	34.5	9.4		19	9	18.6
9.5			40	15.1	9.1	5	1	49	27.2	9.5			10	4.2 A	9.3		4	18	21.3	9.1			18	4.7
9.5		16	6	54.9	9.5			53	53.7	9.5		56	17	3.5	9.5		5	19	51.5	9.0			29	21.6 B
9.3			11	53.8	9.5		2	14	16.4	9.5			39	11.7	8.0			29	22.2 A	8.4			54	4.0 A
8.0			53	43.3 L	9.2			47	37.1	9.5		57	37	36.8	9.4		7	24	19.4 B	9.4		20	4	59.8
9.5		17	7	32.2	9.5			49	10.0	9.3	6	0	12	58.8 A	7.5		10	27	24.1 A	9.5		21	22	33.3
9.1			16	7.0	9.5			58	30.6	9.5			22	48.1	9.0		12	0	36.9 A	8.3			33	5.7 A
9.0			28	25.7	9.5		3	43	12.9	9.5		1	0	30.4	8.8		14	49	52.4	9.4		22	40	29.3
9.5			32	5.1	9.5		4	15	3.0	9.3		2	4	6.2	7.7		15	5	8.5 A	9.3		23	7	27.0
9.3			53	2.9	9.3			32	3.0	9.0			34	2.3	9.4			27	9.1	9.5			46	54.1
9.2			59	0.8	9.4			33	4.0	7.5		3	1	52.1 A	9.4		17	21	0.9	9.4		24	59	1.6
8.8		18	7	55.9	9.0			41	40.8 A	9.5		4	35	45.9	8.7			47	54.8	9.5		27	18	0.6
7.9		19	31	40.4 A	9.2			59	0.0 B	9.4		5	41	13.2	8.8			49	20.6 A	9.1			25	21.2
8.0		20	18	18.6 A	9.0		5	3	22.7 A	9.4		9	12	30.5	9.5		19	40	35.8	4.7			29	49.2 A
9.1			57	50.3	9.5		6	21	26.7	9.4			28	40.2	9.4		22	18	21.1	9.3			50	17.4
8.0		21	24	11.1 A	9.3		7	36	45.3 S	8.6			38	58.2 B	7.8		23	33	56.8 A	9.5		28	23	4.0

701—760					761—820					821—880					881—940					941—1000				
	8ᵘ—9ᵘ		+64°			9ᵘ—10ᵘ		+64°			10ᵘ—12ᵘ		+64°			12ᵘ—13ᵘ		+64°			13ᵘ—14ᵘ		+64°	
m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′	
9.4	8 28	41	18.9		9.5	9 45	43	19.6		9.3	10 48	18	48.1	A	8.3	12 1	1	41.3	A	9.5	13 13	36	7.9	
9.5	29	10	30.6		7.5	46	39	2.6	A	9.5		35	8.5		9.3	3	12	9.1		9.5	14	0	20.1	
9.5	30	47	44.8		9.4	47	48	32.9		9.3	49	55	26.5	R	9.3		21	0.7		8.3		18	30.4	A
9.1	32	5	20.7		9.5	49	14	45.2		6.8	51	54	11.7	A	9.5	5	40	11.3	B	9.5		20	43.2	
8.6	34	40	53.6		9.4	51	56	37.9		9.5	52	9	14.2		9.2	6	4	39.0	B	8.6		42	19.8	B
9.5		45	49.2		8.9	52	11	14.3	A	9.3	53	1	57.4		9.4		56	52.6		7.5	16	22	42.7	A
7.0	37	7	47.3	A	8.0		52	48.1	A	8.8		31	57.9	B	8.2	9	42	26.0	B	9.1	17	14	7.8	A
9.2		38	50.7	A	9.4	54	58	19.1		8.6	54	36	2.4	A	9.0		55	53.5	A	9.4	18	46	7.1	
9.2	38	19	28.6		8.9	56	1	17.6	A	9.2		47	30.0	B	9.0	10	28	59.5	A	6.5	21	2	0.4	B
8.5		46	57.1	A	6.8	58	28	39.3	A	9.5	55	22	51.0		6.8	13	41	29.0	A	9.5	24	14	5.6	
9.1	40	46	14.0		9.3		52	38.9		8.9	56	43	4.4		9.4	14	57	18.9	B	7.0		59	56.4	A
8.0	42	53	0.8	B	7.3	59	20	27.1	G	9.5		52	32.9		9.5	16	27	8.6		9.5	25	54	43.8	
9.5	44	38	37.5		9.1	10 3	16	12.9	B	9.5	59	2	17.2		8.3	17	30	37.4	A	9.5	26	52	42.7	
9.0	45	30	52.1	A	9.3	4	4	18.6		7.5	11 0	50	6.0	A	8.3		48	55.0	A	9.1	27	23	32.5	
9.5	46	47	42.3		9.5	5	38	49.1		9.3	1	25	27.5		8.9		56	50.1	A	9.4	28	8	35.3	
7.5	53	27	37.5	A	9.5	6	31	1.0		9.3	3	14	28.9		6.0	18	19	37.4	A	9.4	29	30	9.8	B
9.3		32	59.5	A	9.5	9	50	0.5		9.5	4	2	24.9		9.0	19	30	18.2		9.5		53	4.3	
9.4		45	7.0		9.0	10	34	27.0	A	8.9	8	17	3.0	B	9.2	20	59	44.2		9.5	30	3	33.5	
9.5	55	0	18.3		9.4	11	14	16.8	A	9.4		23	8.5	B	9.5	21	2	25.2	B	9.5	36	12	30.4	
9.5		38	14.8		8.8		38	35.5	A	8.3	9	46	57.4	A	8.9	22	21	21.0	B	9.5		29	12.8	
8.5	57	54	51.2	A	7.8	14	44	54.0	A	8.2	10	8	18.2	A	9.5		28	6.4		8.3		29	36.3	A
9.0	58	13	6.0	A	9.1		58	51.1		9.5	15	7	52.8	B	9.5		49	21.9		9.5		51	2.3	
5.0		56	6.2	A	8.5	15	3	39.9	B	9.5		10	53.2		9.5	23	2	54.1		9.0	39	32	39.8	
9.0	9 2	0	5.9	B	9.0		53	19.6		9.5	16	32	41.7		8.9		32	41.8	A	8.5		52	27.5	F
9.5		59	58.5		9.5	16	12	28.1		9.4	17	34	2.7		7.7	25	25	33.9	A	9.3	40	1	38.3	
9.5	5	51	0.4		9.0	17	41	54.0	A	8.7		38	36.8	A	9.3	28	5	39.6	B	8.5	42	11	16.7	A
9.5	6	39	49.2		8.5	19	22	39.9		8.2	19	12	58.8	A	9.0	29	9	14.7	A	9.2		33	3.0	A
9.0	8	4	48.6	B	7.5	20	14	4.8	R	7.5	20	34	22.1	A	9.1	30	21	48.2		8.8	43	1	45.1	A
9.1		33	27.1		6.2		21	59.2	A	8.9	22	4	22.0	A	8.7		51	52.4	A	9.1	47	17	24.0	
9.5		53	40.4		8.1		43	37.1	B	9.5	23	26	31.5		9.1	31	2	55.4	B	7.3	49	19	57.9	A
9.4	10	56	6.0		9.5	21	9	2.9		9.4		33	28.0	B	9.3		20	57.9		9.0		27	58.6	A
8.9	13	24	10.9	R	9.2		14	6.8		9.5		49	5.4	B	9.2	32	47	42.6	B	9.5		43	36.3	A
6.5	14	0	34.0	A	9.4	24	35	21.9		8.6	24	2	14.6	A	9.2	33	4	20.5	B	9.4		45	22.1	
9.4		37	49.8	B	9.3		55	24.1	B	8.8		45	41.7		7.2	34	31	34.5	A	9.5	50	47	4.8	
7.8	15	10	57.8	B	8.2	26	0	21.0	R	8.3	26	24	26.4	A	8.5	37	27	40.8	A	9.5	52	17	10.8	
8.3	16	54	59.5	A	9.3		43	12.1		8.8		50	36.8	A	9.5	44	11	19.1		9.5	53	1	18.6	
9.5	18	27	51.2		9.5	27	0	51.3		7.7	30	11	57.8	A	9.5	45	27	27.4		9.5		16	48.2	
9.5	19	30	15.3		9.5		24	7.1		8.8	31	20	52.0	A	9.1		39	35.8		8.4		54	29.9	A
9.4		52	27.6		9.2		59	40.7	A	9.1	32	33	12.0	B	8.8		54	44.0	A	9.3	55	7	28.5	
9.4	21	25	23.7	A	9.2	28	59	40.2	A	9.4		58	40.9	B	9.0	47	40	56.3		9.4		22	19.6	
9.2	23	5	22.8		8.9	29	37	31.6	B	9.5	34	17	12.2		8.8	48	18	9.2		8.9	58	25	19.7	A
9.0		24	21.7		9.4		40	34.2	B	8.8	35	41	59.3	A	8.3	49	4	43.5	A	9.0	59	24	24.2	B
8.9	24	12	55.1	A	9.2		53	11.7	A	9.3	36	30	45.5	B	8.2		12	58.8	R	9.3		26	23.2	
9.5	25	31	12.7		9.5		54	32.9	B	9.5		32	26.4		9.3		58	16.8		8.8		37	10.2	A
9.5		38	54.6		9.3	31	33	59.2		9.3	38	25	36.2	R	9.4	53	26	13.8		9.2	14	3	9	36.4	A
9.5	26	32	46.3		9.0		42	59.5	B	9.0	39	27	56.6	B	9.5	56	6	41.3		9.5		38	28.5	
9.1	31	5	39.4		8.3	32	48	44.1	A	8.4		53	28.9	A	6.0		6	24.0	A	9.5		6	34	1.2	
9.5	32	38	10.6		9.5	35	48	25.9		9.1	40	21	3.3		9.5		59	5	33.0		9.5		35	8.8	A
9.5		39	5.7		9.0	38	0	21.9	A	9.3	44	55	33.8		9.2	13	1	2	1.8		9.4		8	30	4.9	
9.5	33	31	18.6		7.0	39	56	33.2	A	9.3		57	13.2		8.3		2	5	5.1	A	9.2		9	14	50.4	
9.5		48	33.7		9.5	42	35	38.8	R	9.3	47	36	28.4	R	9.4		10	56.0		8.1		36	55.4	B
6.8	34	44	19.1	A	9.3	43	26	4.9	B	8.8	48	15	38.2	A	8.5		3	39	16.7	A	8.3		13	32	28.0	
9.5	37	32	38.3		9.5		40	8.9		9.5	51	14	3.8	B	9.0		4	55	56.5		9.4		15	5	4[illegible]	
9.4		48	50.2		8.3	44	4	19.2	A	9.3	52	25	50.2		9.5		6	26	22.6		8.6		16	10	3[illegible]	
9.4		48	52.8	B	9.3		37	48.1		9.1	54	44	13.7	R	9.4			33	46.6	A	8.8			4[illegible]	
9.5	39	24	28.1		9.4		49	20.1		9.5	56	48	22.7		9.0		10	7	29.9	A	9.3		17	3[illegible]	
9.5	41	43	34.4		8.7	45	17	52.4	A	8.6		53	53.6	R	9.4			36	39.8		7.5		19		
9.5		52	32.4		9.5	46	4	3.1	A	9.0	57	6	0.0		8.0			39	23.6	A	8.2		20		
9.4	42	25	17.6	B	9.5		9	13.0	B	9.0	58	44	14.7	A	9.1		12	58	20.6		9.5				
9.3	44	25	23.5		9.5	47	46	2.6	B	9.1	12 0	46	34.4		9.3		13	20	45.7		8.2				

1001—1060					1061—1120					1121—1180					1181—1240					1241—1300				
	14ᵘ—15ᵘ		+64°			15ᵘ—16ᵘ		+64°			16ᵘ—17ᵘ		+64°			17ᵘ—18ᵘ		+64°			18ᵘ		+64°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
8.8	14	21 15	11.2	A	9.5	15	15 21	17.6		9.5	16	16 32	2.0	B	9.5	17	12 32	47.0		9.5	18	2 55	43.9	
9.5		22 43	26.5		9.3		17 8	30.3		9.3		18 18	19.0	A	9.3		50	44.5	B	8.0		3 0	50.7	A
9.5		24 34	20.1	A	9.4		10	19.5	B	9.5		50	30.9	A	9.5		14 11	14.9		9.4		4 45	45.6	B
9.5		42	30.8	A	9.5		18 20	53.2	B	8.9		19 37	40.6	A	8.5		29	35.7	A	8.8		51	0.7	A
9.5		25 55	57.4		9.5		20 30	12.1		9.3		41	18.1	A	9.1		48	44.3	A	7.0		5 58	11.9	A
8.5		26 24	38.2	A	9.1		21 56	1.1	A	9.1		21 4	1.6	A	9.3		15 2	34.0	B	9.5		7 7	35.5	
9.2		27 27	32.3	A	9.0		22 11	23.5	A	8.6		5	37.6	A	9.2		14	10.5	A	9.5		12	39.5	
9.0		28 35	35.7	A	9.5		23 5	7.1		9.3		29	3.6		9.5		28	41.9		9.2		8 48	12.2	
9.5		38	18.6	A	9.1		25 12	47.0		8.0		22 3	25.0	A	9.3		38	55.7	B	9.4		57	9.6	
9.4		29 28	42.6	A	9.5		26 11	19.0		9.5		24 26	0.6		8.8		16 24	14.9	A	9.5		10 44	0.8	
9.5		32	57.4		9.4		26	44.6		9.4		25 13	47.0	B	7.5		46	10.5	A	9.1		12 51	43.2	B
9.3		42	28.0	A	9.5		27 5	29.4		8.8		14	4.9	A	8.7		18 17	5.6	J	5.0		13 5	19.8	A
9.5		32 8	59.3		9.0		28 14	30.4		9.5		38	1.9		9.5		41	47.3		7.0		37	42.2	B
7.4		58	6.3	A	5.8		55	40.1	A	9.5		26 39	16.7	B	9.4		42	11.4		9.3		14 41	7.5	
9.5		33 46	36.3		8.7		29 10	37.2	A	9.5		27 25	30.8		9.5		50	39.4	A	9.5		57	47.1	B
9.3		35 1	42.1	A	9.0		11	47.0		9.4		28 59	3.4		8.5		19 31	51.6	A	8.1		15 26	0.8	A
7.3		57	55.9	A	8.0		31 45	23.4	B	9.4		29 50	23.4		9.0		33	42.8	A	9.2		43	27.8	B
7.0		36 16	46.6	A	8.8		33 7	34.3	A	9.0		32 15	30.9	A	8.5		20 36	43.8	A	8.2		53	29.0	A
9.5		24	3.4		9.0		59	35.8	A	8.5		35	41.6	A	9.5		23 56	49.3		9.4		17 10	57.5	
9.0		37 43	27.0	A	9.0		34 20	21.5	A	7.7		33 25	13.6	A	9.5		59	44.8		9.5		18 2	45.9	
9.5		38 1	1.6		8.5		35 6	54.9	A	9.5		34 23	49.0		9.5		24 3	23.2		9.0		12	11.4	L
9.3		39 10	25.5	A	9.1		38 26	34.3		9.1		37	11.2	A	9.2		10	11.8	L	9.4		19 2	3.1	
8.8		55	47.5	A	9.0		39 3	27.4		9.3		35 54	26.4		9.0		28 19	41.4	B	7.0		33	7.9	B
9.5		40 11	54.0		9.1		8	56.8		9.5		37 5	11.1		8.0		30 57	37.0	L	9.0		22 2	46.3	L
9.5		41 34	1.3		9.5		40 2	11.7		5.2		39 56	50.7	A	8.5		31 28	22.3	L	9.5		23 29	35.0	
9.1		42 58	6.5		8.7		42 41	55.9	B	9.5		40 37	22.2		9.1		32 54	54.2	A	7.5		24 32	44.9	A
9.0		43 2	20.0		9.3		50	56.5		8.6		45	4.9		9.0		33 54	58.2	A	9.0		42	49.7	A
9.4		41	9.3		9.5		43 36	32.8		9.4		41 6	31.0		8.7		34 40	29.2	A	9.3		55	32.3	
9.2		57	20.5		8.2		44 7	43.5	B	8.0		50 35	21.3	F	9.5		35 50	22.3	A	9.5		26 40	47.0	
9.2		44 54	19.0	A	9.5		45 14	6.2		9.4		52 25	27.2		9.4		37 49	34.6	B	8.0		29 12	58.4	A
7.8		45 21	19.6	A	9.0		46 53	32.3		8.8		36	23.2		9.5		57	39.4		8.9		40	5.2	
9.5		41	45.1		9.5		47 1	42.1		7.8		58	6.1	B	8.2		38 4	55.2	L	8.7		30 29	46.1	A
9.0		46 40	31.3		9.5		48 50	9.7		9.3		53 12	1.6	B	9.2		8	50.2	B	9.5		31 25	19.2	
8.9		48 40	20.5		9.0		49 23	39.7	A	9.4		32	12.5		7.9		39 5	38.5	A	9.5		34 22	8.2	
8.5		49 17	14.2		9.0		44	26.3	A	9.5		33	12.7		9.5		40 56	10.0	A	8.9		42	47.1	
9.3		50 32	38.3		8.3		46	9.7	A	9.5		38	12.5		9.1		42 26	34.5	A	8.2		35 34	57.0	A
9.3		51 19	27.0		9.5		51 4	27.0		9.5		49	21.3		9.5		43 49	53.2		9.5		36 59	59.4	
8.5		55 17	26.5		9.5		43	46.6		9.4		54	11.2	B	8.7		51	40.0	A	9.5		37 32	23.4	
9.5		53	10.3		9.3		52 0	57.3		9.5		54 12	21.8		9.4		44 50	39.4	A	9.4		38 44	7.1	B
9.3		56 35	18.1	A	9.5		53 5	48.5		9.5		46	5.5	A	9.5		46 27	11.4		9.4		48	34.0	B
9.4		58 44	11.7		9.3		54 19	31.5	B	9.5		56 21	4.0		9.0		47 9	8.9	A	9.5		39 2	56.9	
9.4	15	0 6	6.1		9.1		39	12.7	A	9.5		57 1	18.9		7.0		48 7	48.3	A	9.5		2	7.0	
8.3		2 46	59.4	A	9.5		55 43	29.9		8.7		27	31.4	A	9.5		34	44.8		8.9		3	5.5	B
9.5		58	9.2		8.3		56 46	13.7	A	9.4		58 50	55.6	A	9.5		49 7	6.7	A	9.5		40 21	53.4	
9.3		3 10	1.8	A	8.5		58 22	58.2		9.5		59 25	3.6		9.5		42	7.0		9.4		25	37.7	
8.1		18	36.1	B	8.9		37	9.6	B	9.0	17	0 23	54.9	A	9.1		51 12	58.0		9.0		42 42	12.7	
9.5		31	40.2		9.5	16	0 7	29.4		9.1		33	9.4	B	9.0		32	16.8		9.1		43 32	55.6	
9.3		4 49	6.4	A	9.4		3 18	3.1		9.2		55	47.8	A	9.3		53 15	24.2		9.5		53	15.6	
8.0		6 27	38.7	A	9.5		4 17	13.2		8.8		1 16	22.2		9.1		20	40.9		7.7		56	39.0	L
8.0		8 19	25.0	A	9.2		5 6	40.7	A	6.5		27	48.7	A	7.8		34	6.4	A	8.2		45 20	2.9	A
9.3		9 8	2.8		9.4		8	49.0		8.8		44	13.9		9.2		54 47	6.4	A	8.9		46 2	4.4	B
7.5		12	9.9	B	8.7		6 41	38.7	A	9.3		2 58	29.2		9.2		56 7	31.9		8.9		3	43.0	
7.5		20	11.2	A	9.3		7 58	5.9		9.5		4 44	20.8		8.7		24	34.2	B	9.3		29	7.2	
9.5		46	44.1		9.5		9 2	44.3		9.5		45	22.2		8.7		57 4	11.6	L	9.2		48 1	7.8	B
9.5		53	30.9		9.5		6	53.3		9.4		5 47	43.6	B	9.5		11	10.6		8.7		35	17.8	B
9.5		10 36	10.2		9.2		12 29	41.0	A	9.2		7 33	31.1	A	9.3		58	32.0		9.5		39	10.7	
9.4		11 3	38.3		8.2		14 59	37.7	A	9.5		8 17	53.2	A	7.0		58 28	8.9	A	9.0		49 11	20.2	B
9.4		13 19	50.6		9.1		15 48	50.4	B	9.5		10 10	2.0		9.5	18	0 44	11.0		8.9		50 43	12.7	
9.2		28	16.1	A	9.3		54	50.9		9.3		11 6	36.1		8.5		1 21	26.2	A	9.4		52 15	26.4	
9.0		40	18.2	B	9.4		16 24	53.2	B	9.3		13	57.3	B	9.2		2 32	25.7		8.4		15	36.3	B

1301—1360					1361—1420					1421—1480					1481—1540					1541—1600				
	18u—19u		+64°			19u—20u		+64°			20u		+64°			20u—21u		+64°			21u		+64°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
9.4	18	52 36	59.9		9.5	19	34 54	37.8		9.0	20	9 51	27.7	R	8.9	20	52 57	11.8		9.3	21	21 13	57.0	
9.5		46	48.0	B	9.4		55	36.9	B	9.5		10 6	49.7		9.5		53 40	13.3		8.3		38	10.6	
9.5		58	0.6		9.3		35 1	54.6		8.4		8	4.8	A	9.2		53	57.0		8.1		54	34.8	B
9.0		53 21	38.2		8.5		23	43.7	A	9.0		9	4.4	A	9.2		54 50	41.3	R	9.5		56	27.5	
9.5		38	23.0		9.5		31	36.2		9.4		21	8.5	A	9.5		55 3	47.2		8.5		22 34	41.1	
9.0		54 18	18.6		9.3		36 34	46.3	B	8.9		11 2	26.4	A	9.5		23	4.6		7.8		52	38.0	B
8.8		24	7.9		8.8		41	8.7	A	6.9		12 26	19.4	A	9.0		56 37	38.6	A	8.8		23 27	28.1	
9.0		55 40	19.6	A	9.4		42	50.1	B	8.5		13 44	21.3	A	9.1		57 4	3.4		7.9		52	29.3	B
9.2		43	28.9		8.5		37 33	36.4	A	9.5		14 54	23.2		9.5		58 7	57.5		8.9		24 20	24.6	
8.0		56 37	38.0	A	9.1		38 30	23.7	B	7.4		16 39	24.2	A	8.9	21	1 5	38.3	B	9.1		40	40.7	B
8.3		57 3	54.3	A	9.5		30	23.1		9.5		39	36.1		8.4		20	28.4	A	9.3		54	48.9	
9.5		58 50	8.2		9.5		39	43.5		8.4		42	12.0	A	9.5		31	43.1		8.8		25 3	46.9	B
9.5	19	0 45	13.2		8.9		42	40.5	B	9.5		17 0	0.2		9.1		33	13.7		9.5		8	17.2	
9.5		1 7	53.0		8.9		39 16	27.6	B	9.0		18 24	0.9	A	9.1		33	21.5	A	9.1		26 28	16.7	
9.3		18	53.5		9.3		40 47	15.5		9.0		19 1	10.4	A	9.5		45	3.4		9.3		27 19	49.2	
9.3		52	12.4		9.3		41 1	30.1		7.5		36	13.9	A	7.8		48	26.2	A	9.3		52	42.2	B
7.8		2 0	8.2	A	8.5		15	21.0	B	9.3		56	9.9	A	8.5		54	17.0	A	9.5		28 18	10.3	
9.0		20	3.6	B	8.8		31	4.5		9.5		21 8	20.8		9.4		2 29	50.7		9.3		25	58.5	
9.5		28	2.7		9.0		41	50.3	B	9.1		33	58.2		9.3		29	56.0		9.3		28	5.9	B
9.4		43	56.8	B	9.5		42 17	41.9		8.9		44	14.9	A	9.5		3 15	16.1		9.0		33	50.6	
8.4		3 21	49.6	B	8.9		56	22.3	B	9.5		22 17	27.0	B	9.5		57	1.8		9.0		29 1	19.7	
7.5		32	58.9	A	8.8		57	10.7		9.4		23 23	5.8		8.9		4 13	28.6	A	9.5		3	5.7	
8.5		51	38.8	A	9.5		43 30	22.1	B	9.0		43	20.3		9.2		14	7.9		8.8		15	15.8	A
9.5		52	1.0		9.5		44 38	29.6	B	8.6		25 24	9.4	A	8.6		50	24.2	B	8.4		22	52.5	
8.7		57	48.1	L	9.5		38	31.6		9.0		27 22	41.4	A	9.3		5 51	24.0		8.5		30 15	5.1	A
8.9		4 38	12.7		8.0		46 0	20.3	A	9.2		28 7	18.4		9.3		6 3	42.5	B	8.5		21	17.2	A
9.1		5 33	35.0	A	9.1		36	28.6	A	9.5		29 20	7.3		9.4		44	14.3		7.5		59	19.2	A
9.5		34	18.1		9.2		56	22.9	B	9.5		45	17.5		9.1		50	54.1	B	9.2		31 45	41.7	
9.4		6 15	46.1		9.3		47 7	17.5		6.8		30 20	53.2	F	9.2		58	55.4		8.0		59	56.4	B
8.2		7 10	8.8	F	9.4		24	2.8		8.1		31 4	11.6	B	9.5		8 1	7.4		8.9		32 21	46.7	
8.1		8 28	57.4	B	9.0		32	27.6		8.5		32 6	11.9		9.1		19	18.6	B	9.5		38	7.5	
9.5		49	37.2	B	9.5		48 3	37.5		9.5		33 5	28.2		9.5		59	58.0		8.8		34 18	18.7	
9.5		10 22	59.3		8.8		17	19.8	A	9.2		5	0.5	A	9.3		9 47	26.1		9.4		36	8.0	
9.5		46	37.6		9.3		50 6	36.9		8.8		35 9	23.2		8.8		11 7	18.4	B	7.5		38	59.9	A
9.5		11 18	43.1	B	9.3		28	4.7		9.5		36 16	27.7		7.2		53	8.9	A	6.8		46	43.7	R
9.5		19	3.9		9.3		52 5	40.6	B	9.0		40	58.5	B	9.2		12 4	20.4	B	9.4		35 25	23.0	B
7.8		14 47	52.8	A	9.3		53 0	32.6		8.0		37 15	38.2	P	8.2		7	14.0	A	9.4		26	44.4	B
9.5		15 29	52.0		6.3		24	20.2	A	9.5		25	59.0		9.0		15	52.5		9.4		30	7.1	
8.9		43	12.7		9.3		54 35	43.7		9.5		38 12	8.7	B	8.8		19	32.5		8.5		41	8.4	
8.5		16 5	53.9	A	9.3		55 45	14.5		8.2		39 12	31.2	B	8.8		20	28.6		8.4		36 44	9.3	
8.9		17 40	30.4		9.1		57 22	15.8		9.5		40 0	51.3		9.3		56	6.7		9.3		37 30	14.8	
8.8		48	7.8	B	9.0		58 10	49.2		9.4		41 8	15.4		7.5		13 1	31.1	B	8.8		38 35	17.6	
9.0		56	58.5		9.4		12	35.4		8.9		10	44.4		9.2		5	29.5		8.3		37	5.4	A
8.5		18 43	7.5	A	9.5		59 40	41.3		8.8		12	34.1	R	9.5		46	38.9		9.5		40 38	10.0	
8.5		19 5	52.3	A	5.0		56	25.1	G	9.4		42 23	38.0		9.5		14 48	52.5	B	8.4		41 29	19.2	
9.0		20 2	15.7	B	8.5	20	0 35	15.9	P	9.5		43 38	32.9		9.5		15 14	50.3		8.8		42 39	38.0	
9.0		20	55.1	A	6.5		45	12.6	G	8.5		49	3.8	R	5.5		16 29	16.7	A	9.5		43 21	58.4	
9.5		26	36.4	B	9.5		2 6	29.7		9.5		44 38	10.0		7.5		17 2	0.2	A	9.5		33	4.6	
9.0		24 4	45.0		9.3		16	40.5		8.7		45 48	20.9	B	9.4		9	56.2	B	9.4		37	32.6	B
9.4		48	8.3		9.0		27	6.9	S	8.6		47 2	4.4	A	9.5		18 1	29.5		8.8		44	48.6	
9.5		25 30	22.5		8.9		32	9.4	B	8.4		25	3.7	A	9.5		29	56.5		9.4		49	1.2	
9.1		49	28.9		9.5		3 30	51.0	B	8.8		33	26.7	B	9.1		34	33.4		9.4		51	38.1	
8.7		27 25	58.4		9.5		4 33	48.3		9.0		48 26	57.0	A	9.5		19 33	12.3		9.5		44 1	40.6	
8.5		28 1	30.4	A	8.5		5 1	27.7		9.5		32	37.9		9.0		37	15.8	B	6.5		38	29.1	G
9.5		1	22.9		7.2		54	45.7	B	9.4		41	11.3	B	7.4		20 13	22.6	B	9.5		54	52.9	B
9.5		30 3	47.9		8.1		6 6	10.6	B	8.8		49 10	17.3	A	7.2		20	24.7	B	7.5		46 8	33.5	G
9.5		31 3	4.5		7.9		10	44.5	B	9.4		51 25	59.9	R	9.3		23	8.5		9.5		55	53.7	
8.9		33 11	57.9	B	9.5		32	0.2		9.2		52 18	37.1		7.9		30	18.1	S	8.5		47 3	19.2	
9.5		34 33	2.4		9.5		7 13	17.4		9.2		33	21.6	B	8.9		44	24.2	B	7.7		45	2.0	A
9.0		46	53.0	A	9.4		8 27	18.4		9.5		42	51.2	B	8.8		21 0	32.4		7.0		48 3	13.8	A

1601—1660				1661—1720				1721—1780				1781—1840				1841—1900			
	21h—22h		+64°		22h		+64°		22h—23h		+64°		23h		+64°		23h		+64°
m	h ′ ″		′	m	h ′ ″		′	m	h ′ ″		′	m	h ′ ″		′	m	h ′ ″		′
9.4	21 49	17	16.9	B	9.0	22 21	25	46.5	A	9.4	22 46	36	31.9		8.2	23 9	56	1.1	B	9.3	23 34	47	18.9	
9.0		40	57.0		8.8		26	47.5	A	9.0		47	5 33.4		9.4		11	6 48.6		9.4		35	22 50.5	B
8.9		46	59.8	B	9.4		22	1 50.2		9.0			9 24.0		9.2		38	47.9	B	9.5		36	1 58.7	
8.5	51	9	18.7		5.8		26	23.3	A	9.2		12	50.6		9.3		12	28 37.2		9.5			15 40.0	
9.4		28	9.3		8.5		27	44.1	A	9.5		43	9.3		9.5		30	11.5		8.5			27 6.9	A
8.6		39	59.2	A	9.5		53	58.0		9.5		47	18.1		8.8		41	53.0		8.7			39 50.3	B
6.5		42	38.8	A	9.3		55	48.1	B	9.4	48	38	50.9		7.3		13	56 2.2	A	9.1			47 9.1	
8.9	52	15	58.0	A	9.2	23	2	41.6		9.4		41	8.9		9.0		14	11 32.7		9.3		37	15 15.0	
8.5	53	3	50.7	A	9.5		8	19.3		8.6		50	36.4		9.1			16 1.3		8.9			21 7.2	
8.9		3	6.6		9.5		26	52.9		9.2	49	46	41.7		9.0			25 13.0		8.9		38	8 48.6	
7.7		6	55.5	A	9.0		41	18.1	A	9.5	50	39	22.5		9.5			32 29.7		9.5			46 43.5	
9.3	54	25	11.4		8.3	24	36	21.5	A	9.5		41	9.6		9.5			42 24.8		9.3			59 32.7	
7.0	56	9	44.2	A	9.3		43	28.4		9.5		49	1.0		9.5			59 59.8		9.4		39	2 0.9	
9.5	57	47	53.1		9.4	25	59	48.1		9.5	51	28	44.2		8.0		15	53 43.0	A	9.1			11 56.8	
9.1		55	28.5		9.3	26	8	6.0		9.2		44	31.4		9.5		16	45 22.3		9.5			26 6.4	
9.2	58	19	25.1		9.5		16	56.1		9.4		52	13.2		8.0			47 42.9	A	9.1			32 59.1	
8.1		24	47.7	B	8.9		27	43.7		8.9	52	1	50.6		9.4		17	18 18.4		9.3		40	3 15.5	
9.0	59	21	41.5		9.3		41	20.0		9.4		49	15.7		8.2			18 55.8	A	9.5		41	36 55.8	
8.9		53	26.0		7.9	27	37	32.9	B	9.3	53	9	8.5		6.8			40 32.2		9.2			38 18.0	
8.2	22 0	13	52.8	A	9.2	28	15	27.5		9.5	54	5	26.0		9.0			57 42.0	A	8.5			38 5.1	A
9.4		35	24.5		9.4		34	2.8		9.5		12	34.4		9.0		18	3 44.4		6.5			41 4.5	A
8.5		48	56.4	A	7.5	29	9	28.0	R	9.5		32	53.9		9.5			16 21.2		9.5			48 46.9	
9.3	1	11	23.4	B	9.4		17	51.0		8.5	55	13	48.1	A	9.5			27 17.0		9.3		43	34 13.0	
9.2		46	37.6		9.1		30	25.0		9.3		29	21.5		9.5			38 11.5		9.3			34 27.3	
9.4	2	21	45.0		9.5		37	21.0		8.9	56	16	59.6		9.5		19	23 48.0		9.3		44	54 50.2	
9.3		37	52.1		9.4	30	38	37.0		9.5	57	52	53.6		9.5			54 34.2		9.0		45	14 56.7	
9.5		39	24.3		7.5	31	47	30.2	F	9.5	58	0	58.6		9.5			57 22.3		8.9			15 27.3	
9.5		40	6.2		9.5		51	24.0		8.9		34	25.0		9.1		20	18 43.4		8.8			38 23.8	
9.5	3	22	20.3		9.2	32	53	38.8		9.3		54	36.9		9.5			41 45.5		9.3		46	27 32.7	
9.4		39	1.9		9.5	33	6	36.4		9.5	59	19	28.5		6.5			56 49.8	G	9.3			38 2.1	B
9.5	4	28	57.7		9.5		9	0.1		8.9		32	21.1		8.7		21	34 35.1	F	9.5			46 55.7	
9.5		56	41.5		9.2		24	43.2		8.8		58	1.4		8.9		22	45 57.0	R	9.5			55 54.7	
8.6	6	0	15.5		9.5	34	4	58.6		8.5	23 0	32	5.0		9.5		23	35 36.5		9.1			57 13.0	
7.7		19	48.3	A	9.2		10	5.3	A	9.4	1	6	47.3		8.3			35 53.3	A	9.5			57 55.0	
9.4	7	31	53.1		9.4	35	6	41.1		9.3		12	32.9		8.3			40 16.4	A	7.8		47	4 58.3	A
9.2	8	18	46.5		9.4		21	28.5		9.4		16	20.5		8.3		24	4 22.3	A	9.4			41 36.2	
9.4	9	29	37.1		9.3		21	25.5		9.2		50	54.1		8.3			5 16.0	A	7.5		48	53 11.0	A
9.5	10	57	58.1		8.5		36	30.9	A	6.9		57	50.0	B	8.3		25	5 50.2	A	9.4		49	3 20.7	B
9.4	11	19	0.0		8.8		49	27.5	A	9.4	2	20	49.3		6.2			40 56.4	A	9.5			13 30.2	
9.3		20	17.0	B	9.3	36	25	20.6	B	8.5		59	3.4		9.2		26	0 4.9		9.5			34 43.3	
9.1		37	5.8		6.8	37	11	8.0	A	8.8	3	12	24.5	B	9.5			17 44.6	B	9.0		50	15 30.7	
9.5	12	27	46.0		7.3		35	55.3	A	9.2		14	7.6		9.5			34 29.2		9.1			17 47.3	
9.1	13	38	6.8		9.2		59	9.8		9.1		22	33.9		9.4			38 51.6		8.0		51	54 4.3	B
8.8		56	8.9		6.5	38	1	33.9	A	6.8		26	25.6	B	9.4			40 49.6		9.0		52	11 32.7	
8.3	14	17	54.4		8.9		24	48.7		9.0		46	6.6	B	8.5		27	8 24.3	A	9.5		53	47 18.9	
8.0	15	3	3.6	A	9.1		51	36.3		9.4	4	1	11.9		9.4			8 8.5		9.5			49 11.5	
9.2		35	35.7		9.4	39	11	1.6		9.4		16	7.6		9.0			35 44.0		7.5		54	27 38.7	B
9.2	16	15	20.4		9.4		20	38.3		9.3	5	14	47.4		9.5		28	46 20.8		9.3		55	36 27.3	
7.8		28	34.7	A	9.2	40	8	48.1		9.5		36	36.2		8.8		29	25 23.8	R	9.5		56	0 53.8	
9.5		46	57.0		9.5		27	59.0		9.0		41	55.4		9.4		30	34 20.6		9.5			18 5.6	
9.5	17	38	5.5		9.2		34	30.9		9.5		54	12.0		8.0			47 56.1	A	8.9			33 20.5	B
9.4		56	9.2	B	9.3		52	25.9		9.3		54	53.4		9.4			58 19.7		9.5			46 48.6	B
9.0	18	57	9.4		7.3		53	31.9	B	7.0	6	38	0.3	A	9.0		31	2 32.5	B	6.9			49 20.7	B
9.2	19	16	34.6		9.5		53	2.0	B	9.5		50	27.2		9.4			11 30.5		7.2		57	27 38.1	A
9.5		19	58.5		9.2	41	56	56.5		9.5	7	11	8.2		8.2			22 37.9	B	9.5			52 43.7	
8.5		39	27.4	B	8.8	42	0	6.0		9.5		58	57.7		7.5		33	8 1.8	R	9.5		58	3 24.8	
9.3		52	27.1	B	7.0		39	17.6	A	9.5	8	32	49.2		9.5			28 5.6		9.3			13 35.2	
9.2		53	9.8		9.5	43	41	15.2		9.3		43	7.8		7.0		34	30 19.4	A	9.3		59	12 29.3	
8.9	20	3	7.0		9.5	45	40	7.8		6.5		56	38.6	F	9.3			30 34.1	R	9.5			24 44.0	
8.8		27	31.7		9.5		54	29.5		7.2	9	11	13.3	B	9.5			45 28.2		8.0			27 32.7	A

Zone +65°

1—40					41—80					81—120					121—160					161—200				
	0ᵘ		+65°			0ᵘ		+65°			0ᵘ		+65°			0ᵘ—1ᵘ		+65°			1ᵘ		+65°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.5	0	0 24	49.0		7.7	0	14 8	39.2	F	7.0	0	33 0	4.2	G	9.5	0	52 11	8.4		9.3	1	15 57	51.2	
8.7		49	41.5		9.4		22	4.2		9.0		10	23.6		8.8		14	39.3		9.5		16 56	20.0	B
8.2		1 18	38.9	A	8.3		26	22.8	B	6.0		28	19.7	G	8.4		31	26.6	B	8.5		17 22	1.0	
9.4		22	26.7		9.5		58	52.7		9.5		35 52	30.0		9.4		53	18.7	A	7.5		42	19.2	L
9.5		2 6	16.6		9.5		15 0	35.2		9.5		36 17	36.0		9.2		53 52	42.0	B	9.4		54	34.4	B
9.4		47	15.6		9.5		2	19.7		9.4		42	58.7		9.5		54 6	18.2		9.2		18 47	20.9	
9.4		49	22.0		9.2		31	50.7		9.0		56	11.5		9.4		48	42.5		9.2		53	13.3	
9.5		3 0	56.8		7.8		35	24.5	B	7.6		37 4	42.0	B	8.9		56 36	6.6		9.5		19 0	32.4	
9.5		10	28.0		9.5		16 40	28.0		9.2		25	30.5		6.9		36	11.0	L	9.5		18	25.8	
7.9		25	16.4	G	8.3		40	0.2	B	9.2		38 32	53.8		8.5		57 5	39.8		9.5		24	13.4	
8.3		59	42.1	B	9.4		17 9	41.4		8.7		51	58.4		9.5		59 22	27.5		9.5		37	7.1	
9.4		4 9	33.7		9.0		51	58.5		8.8		52	53.4		9.0	1	0 18	29.5		9.5		20 12	43.4	
7.0		10	19.0	G	8.5		57	38.5		9.5		39 1	22.1		9.5		39	0.0		7.5		23	30.5	A
9.2		10	32.9		8.6		18 16	57.5	R	9.5		25	42.2		9.0		56	21.5		9.5		44	29.0	
8.2		30	11.6	G	9.5		39	53.6		9.5		51	39.8		9.0		59	0.0	B	6.0		47	21.2	A
8.9		35	41.2		9.0		53	18.1		9.3		55	55.8	A	8.5		1 1	58.0		9.5		21 44	36.0	
9.0		47	9.6		8.3		19 13	18.6	A	8.9		40 21	16.2	A	9.5		22	2.5		9.1		22 50	0.2	A
9.2		5 1	52.8		9.4		17	25.6		9.5		54	42.8		9.5		52	38.0		9.5		59	39.4	
9.0		6 0	9.6		9.5		20 19	8.4		9.2		41 1	47.0		9.3		2 1	17.1	B	8.8		24 41	3.1	A
9.5		25	19.7		9.5		28	17.8		9.4		3	16.3		8.2		21	6.0	B	9.5		25 21	50.1	
8.0		29	31.8	A	9.5		59	41.2		8.0		42 34	10.1	A	9.5		53	40.8		9.4		57	59.2	
9.5		30	34.1		9.4		21 39	57.6		9.1		43 2	43.8		9.1		3 11	23.6		7.8		26 2	28.6	B
7.3		34	23.8	A	9.3		57	19.1		8.1		41	6.1	B	9.5		4 43	57.1		9.5		24	59.2	
8.6		7 11	49.1		9.0		22 13	19.2	A	9.5		44 32	48.6		9.2		54	0.6		8.7		27 7	33.0	
8.7		14	18.2	A	9.2		33	19.5		9.0		45 2	56.4	A	8.4		6 36	22.5		8.7		28 3	19.6	
9.5		8 24	9.8		9.3		38	38.1		7.0		7	38.9	A	9.4		7 39	13.3		9.3		5	18.7	
8.3		34	9.0	A	6.5		23 9	43.2	A	9.4		30	9.7		9.3		8 11	3.5		9.2		26	32.4	
8.8		41	1.1		8.7		15	0.2		9.0		46 26	15.2	A	9.4		20	3.0		9.5		29 0	40.8	
9.5		10 26	31.7		9.2		24 53	22.5		9.5		47 12	3.5		9.4		55	35.5		9.5		0	14.8	
9.5		28	34.4		6.5		26 2	57.2	G	8.0		12	37.9	A	9.5		9 3	18.7		9.5		17	10.5	
8.9		29	40.1		8.7		9	53.0	F	8.8		19	14.3	A	8.0		15	23.2	A	9.4		30 24	49.1	
9.2		11 16	20.0		9.5		11	33.0		8.8		30	25.1	A	9.5		47	46.8		9.5		55	28.7	
9.5		53	20.5		9.5		47	42.2		9.5		48 38	26.0		9.4		11 5	2.7		7.0		31 1	44.0	L
9.4		12 50	6.8		9.1		27 18	36.5		9.0		49 16	16.2		9.5		12 0	11.9		9.0		32 4	21.1	
9.1		58	11.5		9.3		28 5	55.5		6.0		23	33.0	A	8.8		39	20.7		9.4		16	25.0	
9.5		13 22	57.7		8.9		21	59.4		9.0		50 38	29.5	A	9.1		13 42	5.2		9.5		20	9.6	
9.0		39	0.8		9.3		29	35.7		9.4		51 26	19.6		9.5		44	37.0		9.5		39	59.5	
8.5		40	20.0		9.5		29 56	0.4		9.4		32	48.6		9.4		54	21.1		9.2		33 15	10.7	
8.3		41	39.2	F	9.5		30 49	57.5		9.3		52 1	2.7	B	9.5		14 10	36.5		9.5		16	19.6	
8.7		50	39.8	F	9.0		31 5	4.8		8.2		10	5.4	B	9.0		18	58.4		9.5		34 23	3.9	

201—260					261—320					321—380					381—440					441—500				
	1u—2u		+65°			2u		+65°			2u—3u		+65°			3u—4u		+65°			4u—5u		+65°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
9.5	1	34	44	50.0	8.8	2	15	10	43.5	A	9.5	2	55	6	47.0		8.0	3	45	21	8.9	A	9.4	4	43	43	13.3	
8.8		36	5	10.4	A	9.0			13	21.4		8.0		57	0	54.3	A	8.7			48	24.8	A	9.5		44	3	9.5	
9.5			58	33.2		9.1			25	39.6	A	9.0			44	10.8	A	9.3		47	36	49.0		9.3			30	4.8	B
9.5		38	23	39.6		9.5		18	56	23.8		9.4		58	25	32.7		9.5		48	32	58.8		9.5		46	30	45.4	
9.0			40	9.6		9.5		19	12	21.4		8.5			37	19.2	A	9.5			38	43.7		9.0			43	41.9	
8.4			54	17.0	A	9.4			59	52.5		8.6		59	53	19.6	A	9.4		50	5	35.4		8.9			50	8.9	A
8.8			57	32.7		9.4		20	36	50.6		9.4	3	0	41	15.7	B	9.5			17	28.3		9.5		47	45	56.3	B
9.5		40	42	3.7		9.5		21	26	58.0		9.3		1	24	18.4	B	9.5		52	1	0.0		9.5			52	50.8	B
8.8		41	21	43.3	A	9.5		22	48	43.8		9.0			28	41.1	A	9.3			1	58.6		8.3		48	16	21.1	A
8.5		43	26	28.5	A	9.3			52	58.1		8.5		2	4	41.5	A	8.8		53	2	32.8	A	9.0		49	40	26.1	
9.4			30	29.3		9.4		23	6	49.7		9.5			35	30.8		6.6			8	6.1	A	9.4		51	1	35.7	
9.2			44	50.9		7.0			19	23.6	A	9.4		3	10	57.3		8.5		54	3	26.3	A	9.4			38	16.8	
9.5		44	48	43.0		9.4			23	51.7		9.4			11	54.7		9.5		58	23	55.0		9.0			55	36.5	B
9.5		46	2	3.9		8.9			39	41.1	A	9.3			36	56.8	B	8.2		59	38	32.8	A	9.5		54	51	12.3	
9.5			13	41.1		9.2		25	21	33.8		7.0			38	50.4	A	9.0			53	55.4	A	9.5			56	37.9	
8.6		47	3	44.5	A	9.5			27	28.6		9.5			49	51.0		8.3	4	0	53	51.6	A	8.0		55	17	48.0	A
8.8		48	6	47.0		9.5			35	15.7		9.3			58	47.3	B	9.3		3	56	41.3	A	8.8		56	17	27.1	
9.4		50	14	49.8		9.1			44	52.7		6.5		4	51	6.5	A	9.3		8	41	35.0		9.3		57	5	8.9	
9.5			46	1.0		9.5			49	37.1		9.5		5	59	38.6		9.2			54	7.9		8.5			16	49.4	B
9.5		51	35	39.3		6.1			51	7.0	A	4.5		7	15	6.0	A	9.2		9	52	39.4		9.3			19	33.1	
9.5		52	14	46.5		9.5		26	23	9.1		9.3		9	21	25.8		9.2		10	50	25.3		9.4		58	30	38.1	
9.4		53	22	47.0		9.5		28	29	40.2		9.4		10	3	39.6		9.1		11	26	2.4	A	9.5		59	7	2.0	
9.5		55	12	36.6		9.5			43	26.2		9.3			34	51.9		9.2			34	41.4	A	9.3			31	37.1	B
9.2			40	27.8		8.2		29	9	0.3	A	9.5		13	0	43.0		9.4			56	27.7		7.3			37	52.2	B
9.0		56	11	16.5		9.5			57	39.1		7.0			53	41.2	A	9.5		13	36	8.6		9.5			39	16.3	
9.5			36	9.2		9.1		30	5	15.1	A	8.8		16	1	17.3		9.3		14	0	56.7	A	9.4	5	2	0	1.5	A
9.1		57	24	51.7		9.5		32	3	33.3		8.0		19	1	48.5	A	8.9			15	52.4	A	9.5		3	29	39.9	
9.2			41	19.5		9.5			8	38.2		7.0		20	30	2.5	A	9.3			57	33.2	B	9.0		4	36	49.8	
9.0		58	17	6.0		8.4		33	58	6.9	A	9.5		21	30	30.7		8.1		15	59	49.4	A	9.3		6	27	20.6	
9.3			23	6.2		8.9		35	6	13.8		9.5		22	52	48.0		9.5		16	20	9.1		9.2		7	51	43.9	
9.5		59	21	50.5		8.7			9	6.6	A	9.5		23	56	58.7		8.7			40	33.4	A	9.5		9	8	40.9	
9.5			24	57.8		9.4			59	59.4		8.5		24	26	19.2		9.2		18	27	1.6		9.5		13	36	7.0	
9.4			53	7.6		9.4		36	18	22.9		8.0		26	3	9.9	L	8.3		19	0	57.8	A	9.5			52	30.9	
8.2	2	0	28	49.5	A	9.3			55	5.6		9.3			15	51.4		9.5			21	42.0		8.6		14	8	33.7	B
9.5		2	4	49.0		9.2			55	19.6	B	9.1		27	0	49.9		9.2			50	0.2		9.5		16	12	27.1	
9.4			8	58.5		9.4		38	1	41.7		9.4		28	15	31.0		9.5		22	4	31.8		9.0			15	47.2	
9.5			35	16.1		9.4			8	6.7		8.0			41	39.2	A	9.5		24	12	53.3		9.5		19	0	9.5	
9.4		3	3	59.6		9.2			12	28.2	B	8.7		30	16	29.4	A	9.4			12	55.8		8.8			11	53.1	A
6.0			11	50.0	A	9.5		39	17	25.0		8.1			30	30.4	A	9.2			33	27.9		9.5			20	32.5	
8.9			12	54.9	R	7.0		40	3	1.4	G	9.5			40	50.4		9.4			35	6.0	B	8.8			21	15	30.6	
8.7			33	49.4	A	9.4			10	41.3		9.2		32	30	39.6		9.0		25	9	38.1		9.3			22	8	39.8	
6.8			39	39.1	A	9.5		41	37	19.6		9.0		33	26	42.5	A	9.5			10	4.3		8.0			23	10	1.3	A
9.3		4	38	25.4		9.5			50	9.6		8.9		34	18	49.9	A	9.5		26	38	3.6		9.5			11	48.9	
9.4		5	38	44.6		8.9			56	35.8		9.0			20	49.1	B	9.4		31	43	41.9		9.5			26	51	50.2	
9.2			47	7.3		8.5		43	4	46.5		9.2		35	10	2.3	B	9.5			58	16.1		6.0			27	57	37.8	J
9.5		7	30	49.7		7.0			48	12.6	G	9.5			31	54.8		9.5		33	29	6.7		8.8			28	25	2.5	A
8.2		8	1	35.5	B	9.1		44	34	17.0	B	9.5			57	12.5		8.8			31	29.5	A	9.5			31	16	47.9	A
8.3		9	37	6.8	L	8.6		46	38	33.2	A	9.2			59	26.1	A	9.4			42	12.7	B	9.0			26	52.2	A
9.0			48	16.1		9.5		47	9	39.3		4.5		36	17	2.0	A	9.5		34	6	4.6		8.9			29	32.6	
9.5			55	40.6		9.4			11	13.4		9.5			47	36.7		9.3			55	55.7		9.5			32	7	45.4	A
9.5		10	1	44.9		9.0		48	1	56.8		9.5		37	15	26.7		8.5		35	20	22.6	A	9.5				27	32.0	
9.5			3	49.3		9.5			14	12.5		9.2		38	25	51.7	B	8.9			52	24.9	A	9.3				50	2.3	B
9.0			25	7.3		9.0			43	59.3		7.5		39	26	5.5	A	9.0		36	7	0.4		9.5				53	9.8	
9.5		11	19	27.1		9.2		49	23	36.3		9.5			50	53.0		9.5		37	52	3.0		9.4			33	24	2.5	
9.1			20	8.1		9.3		51	26	39.0		9.5		41	12	31.1		7.5		39	9	44.2	A	8.7			34	22	6.5	A
9.1		12	46	30.9	B	9.5		52	28	34.7		9.5			41	19.2		9.5		40	27	7.5		9.2			35	10	50.7	A
9.3		14	47	3.7		9.2		53	35	35.7		9.4		42	40	38.8		9.5			43	36.8		7.0			36	29	41.5	A
9.3			49	32.9		9.5			39	9.6		9.0		44	17	41.7		9.5			47	47.5	B	9.3			37	42	17.9	
8.4			49	53.5	A	9.3			44	37.2		9.2			37	19.7	A	7.4		43	25	3.0	A	7.6				46	6.1	L
9.4		15	8	31.1		9.5		55	3	36.1		9.4			56	17.3		9.3			32	17.8	B	9.0				55	11.8	

501—560					561—620					621—680					681—740					741—800				
	5ᵘ—7ᵘ		+65°			7ᵘ—8ᵘ		+65°			8ᵘ		+65°			8ᵘ—9ᵘ		+65°			9ᵘ—10ᵘ		+65°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	
9.5	5	39	55	41.9	9.5	7	1	54	21.7	9.5	8	2	58	45.1	9.4	8	50	29	34.4	7.4	9	42	42	28.0	B
9.5		41	59	27.9	7.0		2	0	1.4	F	8.5		3	45	1.0	A	9.4		54	7.0		9.1		43	15	54.9	
9.5		43	48	55.2	9.5			56	28.0		8.1		4	39	15.0	F	9.4		51	5	47.7	8.9			35	55.4	A
9.5		44	47	35.8	9.5		3	14	7.4		9.2		6	32	50.0		8.9		52	25	29.5	9.4			51	24.5	
9.5			55	14.6	9.0		6	2	1.7	A	8.1		7	10	50.0	A	9.4			41	29.2	9.3		47	44	20.6	
9.5		46	26	40.1	9.1			38	42.0	A	8.0			42	52.9	A	9.0		53	0	57.0	A	9.5		51	13	54.3	
7.0			46	30.2	A	9.1		7	28	21.0	A	9.5		9	14	9.7		9.3			49	21.1	B	9.3		53	12	39.6	
9.5		47	18	12.6		9.4		8	29	15.0	B	7.5		10	31	56.4	A	8.7		55	20	33.1	A	9.2		54	29	4.9	
7.3			44	2.4	A	9.2			39	31.6	A	8.5		11	17	20.9	B	9.1			56	52.1	A	7.5		55	3	6.9	F
8.4		51	35	9.0	A	9.1		9	15	40.4	A	9.0			17	54.9		9.5			58	33.0		8.8		57	38	15.1	A
7.5		52	34	24.0	A	8.9		12	24	20.4	A	9.4			22	21.0	B	9.0			58	8.4		9.0		58	17	8.8	A
9.5		54	37	1.8		8.0			47	12.8	A	7.7		12	9	10.8	A	9.4		56	29	57.3	B	9.4			56	39.4	A
9.5			49	11.1		9.2		16	28	49.0	A	8.3		13	45	19.1	B	9.5			36	15.2		9.3		59	26	58.1	
9.5		55	41	12.1		9.4		18	5	48.2	A	8.8		16	48	43.9	A	9.2			51	49.1	A	9.4			33	57.1	
9.0		57	45	6.2	A	9.3			19	49.5	A	8.9		18	22	49.5	A	9.4		57	19	57.6	B	9.5	10	0	38	23.8	B
9.2		58	9	48.4	A	8.5		21	4	58.9	A	9.4			43	13.5		9.1		59	17	27.9		8.0			41	14.7	A
5.7			17	42.9	A	9.2			23	54.9	A	9.5		21	16	48.1		9.4			52	33.3		9.5			53	56.5	A
9.5	6	2	24	12.5		9.4		22	31	54.0	B	5.8			35	37.8	A	8.7	9	0	36	20.7		9.0		1	21	46.2	A
8.2			37	44.4	A	6.8			40	23.2	A	9.4		22	56	58.1		9.1			36	55.0		9.5		2	41	54.8	
9.3			45	50.7	A	neb			44	54.1		9.4		23	1	13.1		9.5		1	22	59.5		9.5		3	5	50.0	
9.0		5	13	10.7	A	9.0			51	32.7	A	9.5			54	19.7		9.5		3	7	34.5		8.1			8	58.0	B
8.4			49	40.4	A	9.3		23	7	53.8	B	9.4		24	53	12.7		9.5		5	20	37.4		8.3		4	27	26.2	A
8.5			54	31.8	A	8.4			9	37.6	A	5.8		26	16	30.6	A	7.5		8	15	38.7	A	9.0			33	2.4	A
9.4		8	42	32.1		9.5		25	42	58.4		9.4			53	52.7		9.3		9	14	30.5		9.5		5	52	13.7	A
9.0		11	16	31.5	A	8.2		28	58	20.3	A	9.1		27	23	4.0	A	8.7			26	26.2	A	8.9		6	10	23.6	A
9.2			21	57.1	B	8.2		29	3	37.1	A	9.5			28	52.3		9.4		10	52	41.0		9.4		7	7	41.3	B
9.2		13	54	46.4	A	9.1			48	45.1	A	9.4		28	30	13.2		9.5		11	29	16.4	B	5.8			28	49.1	A
8.7		14	9	32.8		8.7		30	10	47.0	A	8.0			47	13.2	F	9.5			56	16.6		9.3		8	35	35.8	
9.0		16	39	32.9	A	9.2			36	29.2	A	8.3		29	9	48.8	A	9.5		12	53	43.7		9.4		10	44	33.1	
8.3			42	3.8	A	9.2		31	6	23.9	A	8.3		30	29	43.3	A	9.5		13	5	47.2		8.0		12	24	41.2	B
7.8			43	14.4	A	8.0		32	1	2.5	A	9.5		32	1	37.5		7.6			53	11.8	B	9.0			36	13.6	A
8.3			59	33.5	A	7.3			4	29.5	A	9.4			13	43.4		9.5		14	22	35.0		9.3		13	16	2.4	
7.3		19	50	22.1	A	6.2			46	47.8	A	9.0			19	0.0	A	9.3		16	19	40.1	B	8.0			42	14.9	A
9.5		21	55	53.3		9.5		35	10	51.2		9.5			44	41.4		9.5			53	33.9	B	9.5		14	50	35.6	
9.1		22	24	59.2	A	9.5			14	39.2		8.6		33	13	9.8	A	9.5			54	53.5		9.5		15	26	58.5	
9.5		25	35	10.2		9.5		36	27	20.5		9.2			24	18.4	B	9.5			59	20.1	B	9.5			29	16.4	A
8.0		26	43	6.2	F	9.5		37	49	1.6		9.2			29	54.1	A	9.1		17	5	7.0		8.7		17	27	20.7	A
8.8			50	9.0	B	9.5		38	53	21.8		8.5			42	58.2	A	9.4			5	35.8	B	9.4			43	46.2	
9.0		27	3	11.3		7.5		39	17	15.5	A	9.0			46	28.4	A	9.4		18	16	15.2		9.1		18	9	5.3	
9.2			25	22.4		9.5		41	5	54.2		9.0		34	24	14.6	A	9.4		19	49	24.6		9.1			11	31.5	A
8.7		28	39	10.8		9.4		42	10	31.4		8.6			40	23.7	A	9.5		20	26	45.2		9.2			14	43.7	
9.4		34	53	27.0		9.5			29	11.1		9.3		35	14	46.6	B	8.5		23	31	6.9	A	8.7		19	26	21.0	A
9.1		35	0	0.4	A	9.2		43	39	59.4	A	9.5			16	20.7		8.5		24	57	1.5	A	8.7		21	8	1.2	A
9.2			40	34.5		9.5		44	53	25.9		9.3		37	45	24.6		9.4		25	8	58.5		9.4			19	31.4	A
9.5		37	22	52.2		9.5		46	42	35.8		9.5		38	28	17.8		8.8			11	37.9		9.4			20	25.5	A
9.4		39	0	19.5	A	7.1			54	9.2	A	9.5		40	46	30.0		9.2			18	22.3		8.5		23	57	43.7	A
8.1			28	10.7	A	7.0		49	36	31.8	J	9.5			58	27.5		8.1		26	6	3.0	A	9.3		24	58	7.2	A
9.3		41	0	47.8		9.5		50	3	23.5		9.3		41	13	0.5		8.8			49	46.7		8.4		25	24	36.2	B
9.4			40	24.6	B	9.5			8	12.0		9.5			24	53.7		9.2		28	37	31.2		9.2		26	49	5.7	A
8.4		43	50	27.8	A	8.8		52	9	17.3	A	9.0			47	47.5	A	9.4			39	33.8		9.4		27	37	17.7	B
9.5		45	3	48.7		8.8			55	58.4	A	9.1		43	14	31.2	A	6.3		33	10	38.3	A	8.5		28	9	42.8	
9.5		46	18	43.0		9.1		56	56	23.9	A	9.0		44	7	24.7	A	9.0			47	25.0		9.3			15	47.2	
7.5		47	44	56.6	A	9.1		57	28	39.0		6.0			8	9.0	A	9.2		34	26	17.3		9.5			55	54.5	
9.5		49	14	46.3	A	9.4		59	34	18.0		9.5		45	28	58.0		9.0		35	20	23.3	B	9.5		30	31	8.3	B
9.3		53	24	40.1		9.0			37	10.1		9.4		46	8	11.8		9.5		36	33	39.7		9.5		33	42	59.4	
9.5		56	2	24.9		9.5			38	50.9		9.4		47	13	42.0		7.3		37	27	33.7	A	9.2			48	40.2	A
9.5			44	0.1		9.3	8	0	21	41.3		9.0			19	33.4		9.2		38	28	58.4		8.3		35	22	39.9	A
9.4		59	10	28.0	B	9.2			36	30.5	A	8.9			33	23.6		9.4		39	19	11.8		8.0			29	49.6	A
9.4			10	39.1		9.5		1	31	2.7		8.5		49	30	1.0	A	9.3		40	43	27.4		9.0		37	28	36.7	A
9.5	7	1	15	10.9		9.4		2	25	48.1		9.4		50	27	15.3		9.1		42	11	28.4		9.1			50	10.1	A

801—860						861—920						921—980						981—1040						1041—1100					
	10h—11h			+65°			11h—13h			+65°			13h—14h			+65°			14h—15h			+65°			15h—16h			+65°	
m	h	′	″	′		m	h	′	″	′		m	h	′	″	′		m	h	′	″	′		m	h	′	″	′	
8.7	10	37	56	20.4	A	9.3	11	50	50	37.3		9.4	13	8	32	12.8		9.5	14	8	10	54.3		8.9	15	10	0	50.4	A
8.7		38	32	53.2	B	9.3		52	7	40.5	A	9.3			34	14.1	B	8.2		9	10	37.1	A	9.5		12	5	43.5	
6.5		39	6	53.7	B	6.8		54	10	43.9	A	8.7		9	29	3.8	A	9.5			10	51.9		8.7			19	26.2	B
9.5		40	3	18.0		9.2			15	52.6	A	9.3		10	11	43.6		9.5		10	57	43.0		9.1			21	25.5	B
8.6		42	59	32.7		9.3		56	34	19.0		8.3		14	42	12.7	A	9.3		11	7	37.0		8.9		15	58	28.6	B
9.5		45	54	57.5		9.2	12	0	24	14.2		9.0			46	57.4	A	8.8		12	8	16.1	A	9.5		16	16	32.5	
9.5		46	44	11.2		8.6			28	24.2	A	8.0		15	17	51.0	A	7.2			25	31.2	F	9.5			35	28.8	
7.5			50	18.6	A	neb			49	58.9		9.5			57	31.8		9.4		13	56	18.8	A	7.8			35	57.1	L
8.8		47	38	26.2	A	9.3			57	36.9		9.3		17	33	32.2		9.5		14	25	24.2		9.5		18	4	38.4	
8.8		48	51	5.7	A	9.4		1	15	58.6		9.5		18	52	0.8		9.3		15	31	18.0	A	9.5		19	48	42.8	
8.3		49	16	48.8	A	9.0		2	57	59.6	A	9.0		19	33	59.4		7.9			38	2.2	B	9.5		20	29	32.5	
9.0		52	4	59.9	A	9.3		3	32	9.8	A	8.0		20	21	35.8	G	9.3		16	34	25.6	A	8.5			41	32.3	B
9.1			25	53.5	A	8.7		4	39	1.4	A	9.4			27	41.3		9.5		18	25	0.3	A	9.5		22	0	11.6	
9.4			50	33.5		7.3			56	16.2	A	9.2		21	20	29.6		7.5		20	16	24.2	F	9.0		25	9	21.5	
9.5		54	18	58.1		8.8		6	40	15.2	A	6.7		22	11	29.2	A	8.8		21	36	48.8		9.5		26	2	54.2	
9.4		55	2	58.6		9.5		7	47	26.1		6.7			18	27.3	A	9.3		24	24	32.8		9.5			8	44.9	
7.1		56	23	35.1	B	8.3		8	12	59.1	A	8.9		23	42	29.2	A	9.5		27	4	44.4		8.8		27	53	40.4	
9.5			24	41.9		8.7		13	26	35.1	A	9.4			55	8.8		9.0		28	55	45.5		9.5			56	8.7	
9.2	11	1	35	31.9	A	9.5		16	55	16.1		9.1		24	40	37.5	A	8.6			56	31.5	B	9.5		28	42	8.7	
9.0			45	29.5	A	8.6			58	19.9	B	9.5		25	31	29.4		8.5		31	28	36.1	B	9.1		30	14	46.3	
9.5		2	30	50.8		9.4		17	3	41.3		8.6		26	40	49.1	A	9.5			43	46.4		8.5		31	46	40.8	L
9.4		7	3	45.8		9.4			18	19.0		8.9		27	8	39.7	A	9.5			58	31.2		6.8		33	32	44.8	L
7.0			7	41.8	B	9.5		18	14	42.3		8.6			30	14.6	A	9.4		35	12	47.5		9.5			49	30.4	
9.5		8	35	58.8		9.5		23	10	31.1		9.5			32	50.5	A	8.8			45	39.5		8.7		34	15	23.6	B
9.3		9	55	14.5		9.5			28	58.2		9.5		29	44	41.2		9.5		36	54	45.0		9.5		36	5	42.9	
9.5		10	8	27.6		9.2		25	11	59.6		8.3		30	12	59.9	A	9.4		37	46	19.7		9.1			27	25.2	
9.3		14	11	18.4		9.4		27	15	9.6	B	9.1			55	13.1		9.3		38	13	18.2	B	9.0			46	8.1	A
6.0			13	7.7	A	9.2		28	10	58.7		8.7		32	7	44.1	A	9.5		41	43	18.1		9.5		37	24	31.7	
9.0			17	31.1		9.4			16	9.7		8.8			44	36.5	A	8.8		42	3	35.1	A	7.3		38	7	7.2	A
8.0		15	37	50.7	A	9.5		29	52	40.0		9.4		34	6	48.6		9.5			21	38.0		9.5			51	10.5	
9.3		18	29	57.7		8.6		31	0	20.9	A	9.4			45	29.5		8.5			32	57.7	A	9.5		39	43	32.8	
9.2			36	55.7		9.0			26	5.1	B	9.3		35	55	3.8		7.8		43	9	13.6	A	8.9		40	2	48.8	A
9.4		20	36	58.2		9.0			52	56.9	B	6.0		36	59	33.5	A	8.9		44	2	20.3	A	9.5			16	48.3	
9.5		24	49	22.2		8.8		33	15	28.5	A	9.0		37	40	5.8	A	8.0			36	9.7	A	9.5			20	57.1	A
9.4		25	51	32.5		8.3			55	57.1	A	9.4		38	42	2.0	B	7.5			56	50.3	F	9.5		41	39	57.1	
9.3		26	55	6.8	B	9.4			59	42.9		8.8		39	40	5.3	A	8.8		45	19	57.7		8.8		43	5	0.3	A
9.2		27	2	27.6		9.5		35	8	33.2	B	8.0			45	45.1	A	8.3		46	2	43.9	B	9.5			6	10.1	A
8.8			15	7.1	A	9.5		38	42	4.3		8.9		40	2	51.0	A	8.6			20	12.1	A	9.2		44	8	29.1	
9.3			51	2.2	A	8.3			52	24.8	A	9.5			25	6.8		8.0			59	10.6	A	9.3		48	21	39.4	
9.5		28	39	26.9		9.5		40	3	20.6		9.1			31	23.2	A	9.5		48	36	33.7		9.5			28	38.9	
9.5		29	18	13.5		8.5			4	46.3	A	7.8		41	4	21.3	A	9.5			46	47.5		6.8			34	13.6	F
9.4		30	1	34.7		9.0		42	43	39.3		9.1		44	21	56.4		9.5		49	23	13.6		9.5		49	51	50.3	
6.7			40	8.2	A	8.0			54	32.3	A	4.8		47	12	26.9	A	9.5			52	23.8		9.3		50	15	47.8	
9.0		32	20	29.5		9.4		43	37	27.4		9.4		48	22	11.7		7.5		51	42	14.1	A	9.1			39	22.8	A
9.3			48	2.2		9.5		44	11	51.6		9.5		52	29	23.3		9.5		55	20	12.6		9.5			40	19.3	
9.0			52	0.3	A	8.9			46	0.8	A	7.2		54	28	37.2	A	9.5		56	7	30.9		9.1		52	2	11.7	A
8.8		34	57	9.2	A	9.5		46	50	50.8		7.7		55	6	5.8	A	9.5			19	26.9		6.5			7	41.9	A
8.0		36	1	46.3	A	9.0		47	2	19.9		9.5			30	21.9		9.5		57	8	25.2		9.4		54	13	42.4	B
9.3		37	52	0.6	B	8.9			19	30.3	R	9.2			38	23.9	B	9.0			22	28.5		9.4			24	45.8	
9.4		38	2	17.2	B	9.5		48	25	40.1	B	9.2			46	23.8	B	9.2			46	40.8	B	9.5		55	37	38.0	
7.1		39	9	12.1	A	9.1			44	12.6		9.5			52	46.6	A	9.0		59	0	36.1	A	9.5			54	52.2	
9.0			31	57.7		9.3		49	46	10.5		9.2		58	21	19.4		8.8			10	6.8		8.8		56	17	48.8	
9.5		40	45	38.0		7.0		52	33	42.5	A	9.4			38	2.3		9.0	15	2	23	22.3	A	7.7		58	9	17.5	A
9.5		43	32	15.6	B	9.4		56	16	22.9		9.3			41	14.6		9.2		3	30	5.5	A	8.5			13	8.2	A
8.0		45	38	51.3	A	8.9		59	30	22.7	A	8.9			52	37.1	A	9.3			40	59.8	A	6.5		59	35	20.2	A
9.4		46	40	41.0		8.5	13	0	9	23.6	A	9.0		59	16	25.9	A	7.2		5	8	16.4	F	8.8			46	54.7	A
9.4			47	41.9		9.5		3	22	47.6		9.5	14	0	5	55.8		9.1			15	27.5		8.4	16	4	5	42.0	A
9.5		48	59	47.3		9.5			27	12.7		3.4			26	3.5	S	9.5		6	3	27.9		6.8			46	3.8	A
9.5		50	2	17.7		9.4		4	36	4.8		9.4			54	7.8		6.8			19	4.8	F	8.5		6	47	13.1	B
9.3			43	40.4		9.0			51	58.9		9.0		4	54	38.5	A	9.3		8	46	11.6		9.5		7	28	49.8	A

1101—1160			
	16ᵘ	+65°	
m	ᵘ ′ ″	′	
9.5	16 8 55	47.7	
9.5	9 23	34.3	
9.5	10 19	1.8	
9.2	11 8	35.5	B
9.2	12 15	35.7	B
9.0	13 49	36.4	B
7.8	58	25.6	A
8.5	14 32	10.6	A
9.2	15 22	36.2	A
8.8	30	13.6	A
9.5	54	56.5	
9.0	17 14	7.6	A
9.0	18 28	57.9	A
9.3	19 1	49.6	A
8.3	9	19.5	A
9.0	23	51.0	A
8.9	22 6	26.6	
9.0	41	28.6	
9.0	24 28	53.4	A
9.5	25 30	42.2	
9.0	26 22	54.5	A
7.2	28 0	6.1	A
8.2	17	9.9	A
9.3	29 37	48.1	A
9.0	41	5.6	A
9.0	31 16	50.6	A
9.0	44	0.2	A
9.5	32 44	10.5	
9.5	58	20.4	
9.2	36 2	56.4	B
9.3	12	29.6	
9.5	34	56.4	
8.8	37 30	42.1	
9.3	34	36.2	
9.4	38 3	26.6	B
9.5	39 8	7.1	
9.5	18	56.9	
9.0	28	23.3	A
9.5	40 56	40.2	A
9.4	42 26	4.5	A
8.0	43 28	30.5	A
9.5	44 46	4.5	
9.4	49	21.1	A
9.5	45 22	8.0	B
9.5	56	58.9	
9.3	47 7	12.8	A
9.5	47	36.7	
9.4	49 33	41.1	
9.1	50 1	43.1	
8.0	49	27.2	L
9.5	52 6	8.4	
9.3	15	52.9	
9.2	55	47.1	
9.1	53 5	51.9	
9.5	54 20	59.8	
9.0	39	8.4	
5.3	55 15	21.2	G
9.5	40	0.6	
6.7	44	15.3	G
9.5	56 1	39.1	

1161—1220			
	16ᵘ—17ᵘ	+65°	
m	ᵘ ′ ″	′	
9.1	16 58 41	26.2	A
9.5	57	8.0	
9.5	17 0 47	51.9	
9.5	2 50	58.8	A
9.4	51	6.5	
9.2	3 35	25.2	A
8.9	4 27	21.5	A
8.5	5 25	8.0	A
9.3	27	47.6	
3.0	8 24	53.9	A
9.5	10 5	51.0	A
8.8	11 17	31.1	
9.3	14 21	39.6	
9.4	15 14	50.1	B
9.0	16 39	27.8	
7.5	20 19	47.6	A
9.5	22 15	33.0	
9.5	31	10.4	
9.5	23 9	1.0	
9.4	31	18.7	
9.2	46	42.5	B
9.2	57	36.8	B
9.5	24 54	52.9	A
9.3	25 47	54.0	A
9.3	50	30.1	
8.7	53	21.6	A
9.0	27 10	12.8	A
9.2	44	56.5	A
9.4	28 33	11.3	A
8.8	29 33	12.9	A
9.5	30 24	41.6	
9.3	26	12.2	A
8.5	51	27.2	A
9.3	31 40	52.9	A
9.4	46	30.1	A
8.7	34 3	20.8	A
9.3	31	50.0	
9.5	35 38	34.1	
9.3	36 43	41.1	
9.5	51	44.6	
9.2	37 53	29.8	
9.1	38 57	24.3	B
8.0	39 26	3.5	L
9.1	29	32.6	
8.5	38	24.4	B
8.2	40 41	17.3	L
9.3	41 12	45.4	B
8.2	24	58.9	
9.5	31	49.6	
9.1	40	33.1	
9.3	56	4.5	
9.5	44 28	32.0	
9.5	45 33	17.2	
9.0	46 2	30.8	A
9.5	47 22	16.8	
9.5	49 0	30.8	
9.5	53	39.5	
8.8	51 19	50.9	A
9.1	23	43.5	B
8.0	54 8	1.5	L

1221—1280			
	17ᵘ—18ᵘ	+65°	
m	ᵘ ′ ″	′	
9.5	17 54 20	29.4	
9.5	55 0	46.3	
9.2	25	47.8	B
9.3	26	46.3	
9.3	29	34.8	
9.3	31	54.9	B
9.5	31	55.7	
9.5	42	11.3	
8.9	56 47	50.4	
9.3	57 27	43.5	
9.3	58 20	26.0	
8.5	18 0 37	53.4	A
7.0	1 15	57.2	A
9.5	37	54.2	B
9.5	55	21.1	
8.8	3 52	27.4	
8.7	4 4	42.4	B
9.5	20	58.7	
9.2	37	21.6	
6.8	59	42.0	A
7.3	5 4	3.0	A
9.0	32	50.8	A
9.0	6 16	48.6	A
9.5	32	58.8	
7.5	50	52.3	A
9.0	9 9	18.7	A
8.0	10 10	20.6	A
9.0	12 2	33.8	B
9.5	14	23.9	
8.7	15	57.2	A
9.4	13 12	16.3	A
9.0	13	49.0	
9.2	31	53.0	
9.4	15 34	41.5	
9.0	59	26.3	
9.2	16 12	2.0	
9.5	17 12	41.7	
9.5	18 10	2.5	
9.1	19 20	49.5	
9.4	26	13.8	B
9.1	39	24.2	
8.0	53	15.3	A
9.4	20 23	43.6	
9.4	29	45.8	B
9.1	22 45	28.6	
9.2	23 38	55.5	
8.4	24 13	9.8	L
8.4	25 4	40.7	L
9.4	10	14.3	
8.6	27	13.3	A
5.0	34	27.9	A
9.5	27 3	28.4	
9.2	28 9	0.8	
9.5	48	51.0	
9.2	29 28	59.7	
6.8	30 52	20.0	G
8.5	31 30	15.5	G
9.3	32 54	5.8	
9.2	58	19.0	
9.5	33 22	6.8	

1281—1340			
	18ᵘ—19ᵘ	+65°	
m	ᵘ ′ ″	′	
9.5	18 35 27	57.6	B
9.0	40	39.3	B
6.0	44	20.9	A
9.5	36 27	8.7	
8.8	39 25	48.1	A
8.5	41 9	10.6	
9.0	21	9.2	
9.5	42 26	52.9	
9.0	43 36	41.2	B
9.3	44 14	7.9	B
9.5	53	45.1	
9.4	45 11	54.9	B
8.5	43	50.5	L
9.3	43	51.3	B
9.5	46 13	24.6	
9.5	47 52	35.5	B
9.5	48 11	27.4	
9.5	15	15.0	
9.5	33	37.0	
8.6	49 0	19.6	A
8.4	50 45	3.2	S
9.1	51 42	57.9	A
9.5	52 5	44.6	
9.0	37	1.1	B
9.5	53 47	32.8	
9.3	47	28.7	
9.5	54 37	33.3	
9.5	54	25.9	
5.5	55 49	4.5	A
9.5	56 10	27.1	
9.5	57 36	3.7	
9.4	59 33	51.0	
9.1	19 0 12	5.7	
9.0	25	10.2	
9.5	44	55.4	
9.5	1 30	55.7	
9.5	47	35.5	
8.4	52	20.0	L
7.3	2 53	21.7	L
9.5	4 48	39.4	
9.0	5 13	22.9	
9.0	16	13.0	
9.1	7 12	28.4	
9.5	8 43	6.2	
8.1	9 12	8.7	A
6.9	14	44.2	A
8.9	31	52.1	A
9.5	10 12	16.8	
9.4	31	4.9	
9.0	11 49	7.4	
9.5	12 48	26.7	
8.8	13 17	47.4	
7.6	55	1.0	A
7.9	14 3	18.1	B
8.0	53	51.6	A
9.5	15 31	13.2	
8.9	56	17.5	
9.0	16 16	50.6	A
8.8	23	57.8	A
8.9	17 29	4.9	A

1341—1400			
	19ᵘ	+65°	
m	ᵘ ′ ″	′	
9.5	19 18 53	13.5	
9.5	19 9	57.8	
9.3	17	16.9	B
9.5	55	12.5	
5.3	56	26.5	A
8.9	20 0	50.6	A
9.0	10	35.6	L
9.2	25	36.3	
9.5	31	32.9	
9.4	21 4	44.0	
8.9	22 9	30.5	L
9.5	23	26.4	
8.5	23 15	18.9	A
8.5	18	22.1	
9.5	22	4.3	
9.5	49	52.0	
9.5	56	48.8	
9.5	24 7	57.0	
9.5	24	44.9	
9.3	53	1.5	
8.7	26 43	43.1	A
9.0	54	29.0	
9.3	27 5	9.1	
8.3	30 18	57.2	A
8.0	53	37.8	A
9.5	31 2	27.0	
8.2	32 7	42.3	A
9.3	34	14.3	
7.5	33 4	12.7	A
9.4	10	12.4	B
8.9	37	16.6	A
9.3	34 20	24.3	
9.4	46	38.6	
9.4	56	29.7	
9.4	36 8	16.3	
9.5	13	35.9	
8.7	40	17.3	L
9.5	53	56.8	B
9.5	37 1	50.8	
9.4	13	26.6	
7.5	38 6	4.0	L
9.5	17	21.8	
9.3	25	23.3	
7.6	26	1.8	L
9.5	54	45.3	
9.1	39 13	14.3	
9.4	56	42.8	
8.8	59	58.4	
8.3	59	15.4	L
9.5	40 24	33.5	
9.5	57	54.4	
9.5	41 1	38.4	
9.5	42 3	14.7	
9.5	22	51.0	
9.0	43 6	46.6	
8.7	15	45.1	
9.0	44 17	48.8	
9.3	26	50.1	
9.0	45 29	57.5	
8.2	46 0	2.3	F

1401—1460					1461—1520					1521—1580					1581—1640					1641—1700				
	19ᵘ—20ᵘ		+65°			20ᵘ		+65°			20ᵘ—21ᵘ		+65°			21ᵘ		+65°			21ᵘ		+65°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
9.5	19	46 12	45.8		9.5	20	24 12	27.4		9.4	20	54 33	3.0	A	8.0	21	20 31	32.4	F	9.0	21	41 2	41.0	
9.5		41	55.0		9.3		27	2.0		9.5		55 20	2.8	A	7.8		21 8	32.1	F	9.5		49	9.8	
9.1		45	26.6		9.2		30	6.5		9.5		22	54.9		7.8		22 39	14.1	R	8.7		55	51.2	R
8.5		59	5.0	F	9.3		47	56.1		9.5		36	59.7		8.8		23 17	27.4	R	8.6		42 2	50.0	R
9.5		47 3	31.9		9.1		49	59.7		9.5		42	25.7		9.0		24 5	8.8		9.3		26	7.7	
8.5		48 16	35.0		6.3		26 9	16.3	A	9.5		51	42.0		9.0		17	42.2	R	9.5		31	48.0	
9.5		46	29.5		9.3		18	33.6	B	9.5		56 14	37.2		8.8		44	6.8		8.1		37	16.0	F
9.5		49 0	27.4		8.5		28	22.2	B	9.3		42	26.2	A	8.0		49	26.4	R	9.5		45	3.0	
7.2		50 4	9.8	A	9.5		42	16.2		9.5		52	58.6		7.8		25 5	15.1	R	9.5		43 5	20.2	
9.5		13	33.5		9.4		27 10	38.1		9.2		57 39	20.4		8.8		17	47.4	R	9.5		52	50.5	
9.1		51 27	10.3		9.0		27	0.1		8.3		44	50.9	A	9.0		19	37.0		9.5		44 9	19.1	
9.0		48	40.8	A	9.3		29	29.0		8.5		58 39	0.2		8.5		25	26.0	R	9.5		35	17.6	
9.5		52 44	8.4		8.9		28 30	44.3	A	9.4		59 47	16.8	A	8.5		26 15	18.6		9.5		38	45.0	
9.1		53 23	15.9	B	9.4		40	28.6		9.5	21	0 54	50.0		8.4		41	16.1		8.2		45 16	52.4	R
9.5		54 22	42.8		8.4		45	34.0	A	9.4		2 23	19.4		9.5		47	52.0		9.5		41	56.1	
9.0		22	27.6		9.1		52	14.5	A	9.1		39	3.7	B	8.4		54	28.5		9.3		56	23.2	
9.5		36	24.6		9.0		30 37	9.9	A	9.2		51	46.4		9.1		27 48	7.3		9.4		46 7	43.6	
8.4		55 5	55.9	A	9.5		51	38.7		8.7		56	2.2	R	9.5		28 52	28.4		9.5		25	11.8	
9.5		56 15	52.5		9.5		31 34	45.7		8.7		3 4	32.6		8.4		29 29	28.5		9.3		27	27.6	
9.5		37	29.0		9.4		32 33	38.0		9.4		9	47.4		8.6		32	8.8		9.5		33	11.8	
9.2		57 25	37.8		9.5		56	56.4		8.9		20	56.9		8.8		30 20	37.3	R	9.5		38	52.3	
9.5		59 50	46.7		8.8		33 31	3.6	A	9.5		5 8	16.7		7.5		31 2	5.8	P	8.6		45	12.9	
8.0	20	0 42	28.5	L	9.3		41	10.9		9.5		10	22.0		9.4		6	49.0		9.0		47 45	0.8	
9.5		1 41	21.7		9.5		34 18	26.1		9.5		14	2.9		9.4		11	24.4		6.6		48 1	4.1	A
9.0		41	27.7		8.4		35 49	51.2		9.5		34	18.5		9.5		25	32.0	B	9.4		28	44.6	
8.5		2 28	17.3		9.1		36 18	18.8		9.3		6 5	47.4		9.3		33	57.9	B	9.5		45	21.0	
9.1		45	37.8		9.3		37 13	47.1		9.4		6	36.3		9.0		48	28.8	B	9.5		49 1	17.2	
9.5		54	53.1		8.8		14	54.3	A	9.2		30	47.9	R	9.5		32 12	47.2		9.5		19	31.7	
9.5		3 16	14.6		8.9		19	36.5		9.5		31	1.9		8.5		29	5.8	B	9.4		25	14.8	
9.3		44	57.6		9.4		29	13.3		9.5		33	33.3		8.5		40	0.0	A	9.5		28	53.5	
9.0		51	26.7		9.5		39 12	39.6		9.1		38	48.1	B	9.5		33 22	31.4		9.5		54	7.8	
8.3		4 50	16.3		9.5		13	23.5		7.0		7 29	5.9	G	9.4		31	15.2		9.5		50 5	51.2	
7.0		5 48	53.1	A	9.5		36	41.8		9.5		48	0.1		8.1		34 1	24.8	A	9.5		6	46.0	
9.5		6 49	24.3	B	8.9		39	59.4	A	6.9		8 4	33.8	J	9.5		12	57.7		9.4		17	23.6	
9.4		7 43	19.3		9.5		40 25	26.9		9.5		12	48.7		9.5		32	1.2		9.0		32	56.8	R
9.4		45	9.3	B	9.4		25	14.0		9.1		24	13.0		9.5		48	13.1		9.5		41	30.5	
9.3		8 59	22.2		9.5		28	21.4		9.5		35	3.9		9.5		57	8.5		9.5		56	21.1	
9.5		10 25	10.9		9.5		40	34.4		9.5		41	54.0		9.3		35 9	22.6		9.5		51 4	9.3	
9.1		11 30	48.8	A	7.0		55	48.5	F	9.5		9 53	31.4		9.5		11	49.5		9.5		25	34.0	
9.3		12 31	29.0		8.5		41 28	41.0		9.1		10 14	46.0		9.4		18	1.7		7.5		31	2.4	A
9.5		13 17	40.1		9.5		39	51.4		9.5		29	26.0		9.4		49	53.7	R	9.5		52	58.4	
9.0		46	27.7	A	9.5		42 38	2.8		7.7		57	55.3	A	9.5		50	10.8		9.1		52 9	44.3	
7.7		14 14	24.7	A	9.1		43 26	4.1		9.5		11 22	29.6		8.8		36 3	11.9	A	8.5		15	44.7	R
9.5		55	48.2		9.0		48	59.4		8.9		49	43.2		9.4		9	8.4		8.9		19	45.2	
9.3		16 16	59.3		9.5		46 35	39.1		7.9		12 53	15.5	B	9.0		23	16.0		9.5		33	7.9	
9.1		17 6	9.3	B	9.1		47 7	45.0		9.2		59	56.2	A	8.5		30	4.8	A	9.4		42	58.1	
9.4		10	1.5		9.4		20	45.2		8.8		14 29	1.4	A	8.3		37 33	39.7	A	9.5		50	59.6	
9.5		13	26.0		8.7		48 59	14.8		9.5		30	6.1		8.8		45	14.8		9.3		53 9	11.7	
9.4		55	32.7		9.2		49 11	6.9		9.3		15 4	5.7		9.3		38 8	57.4		9.2		12	50.6	
9.5		18 26	21.2		8.7		25	29.6		9.5		25	6.9		9.4		33	59.2		7.5		18	19.6	G
9.4		53	33.6		9.5		50 1	22.5		9.0		29	8.4	A	9.1		42	28.2		6.5		29	27.7	G
9.1		19 5	40.3		9.5		2	42.6		9.5		43	36.5		9.5		55	49.4		9.5		39	32.2	
9.2		20 34	45.3		9.5		3	53.4		8.0		53	33.4	A	9.5		39 7	27.7		6.8		42	27.0	G
9.2		43	19.5	B	9.1		51 20	23.1	A	6.8		16 6	22.9	A	7.6		8	41.9	A	9.5		54 18	47.4	
9.5		21 22	18.0		9.5		38	59.4		9.5		33	4.6		9.3		24	24.7	B	9.5		56	44.4	
9.5		22 3	21.5		9.3		45	16.7		9.3		34	16.8		9.5		25	25.4	B	9.4		55 16	23.5	
9.3		35	4.1	B	9.5		52 54	9.7		9.2		18 18	39.2	R	9.4		30	26.9		9.5		44	38.0	
9.5		48	7.6		7.3		53 10	7.5	A	8.5		19 2	21.5		9.4		38	26.4		9.0		57	13.2	
9.5		56	9.6		7.8		54 7	16.0	A	9.2		6	44.6	R	9.5		40 36	43.1		8.9		56 2	26.8	
9.2		23 8	32.6		9.4		12	3.0	A	8.7		19	23.5		9.1		48	12.8		9.3		3	38.2	R

1701—1760					1761—1820					1821—1880					1881—1940					1941—2001				
	21ᵘ—22ᵘ		+65°			22ᵘ		+65°			22ᵘ—23ᵘ		+65°			23ᵘ		+65°			23ᵘ		+65°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
9.4	21	56 17	54.5	R	9.3	22	18 32	15.3		8.6	22	46 28	14.3		9.5	23	16 10	13.0		9.5	23	39 18	41.9	
9.1		18	19.5		9.5		19 23	6.5		9.4		46	43.2		9.4		17 15	36.7		9.4		22	20.8	
9.5		53	7.1		9.2		31	25.1		9.4		47 9	42.0		8.1		49	56.8	A	6.3		23	58.5	A
8.1		57 13	23.1	G	9.0		43	35.5		9.5		21	57.8		9.3		18 16	43.2		8.9		40 29	47.3	R
9.5		31	24.8		9.0		46	30.0		9.4		37	37.2		9.5		27	33.8		9.5		32	53.1	
9.5		42	49.6		9.3		21 11	4.4	B	8.0		40	50.6	F	9.5		29	35.1		7.2		41 13	27.6	A
9.5		58 7	31.8		9.5		36	17.2		9.0		46	43.4		8.3		42	23.9	A	7.8		16	36.1	A
8.1		19	8.3	G	9.3		22 7	0.4		9.3		48 14	19.7		8.4		19 27	1.2	A	7.5		18	50.7	A
9.5		30	52.8		9.4		33	28.0		9.1		49 7	58.5		9.3		46	6.6		9.3		26	25.9	
9.5		42	8.4		9.0		23 36	42.0	B	8.6		50 0	38.8	A	9.5		46	31.0		9.5		42 17	2.9	
8.9		46	56.5	R	9.5		24 2	53.6		9.5		6	23.6	B	9.5		20 11	6.0		9.5		30	0.4	
7.0		58	21.8	G	9.5		16	37.5		9.1		16	33.0		9.5		38	47.5		9.5		56	1.0	
9.1		59 11	59.0		9.5		36	49.1		8.0		48	57.6	A	9.5		47	51.0		9.4		43 26	21.7	
9.5		41	18.3		8.0		25 11	43.8	F	9.0		51 33	44.7	A	9.5		51	46.2		9.1		44 32	46.7	
9.5	22	0 4	7.7		9.3		46	11.0		9.4		52	33.5	B	8.9		21 29	39.4		8.6		45 8	38.9	
9.5		17	4.0		8.6		51	42.8		8.5		57	16.7	A	9.5		46	2.1		9.4		13	28.8	
8.7		18	2.2	G	9.4		27 30	14.3		8.6		52 11	41.7	A	8.7		22 30	58.1		9.5		46 4	3.3	
9.5		34	45.2		8.5		45	55.0	B	9.0		54 58	40.3		8.9		41	31.4		8.2		8	35.8	B
9.3		59	28.4		9.5		57	20.5	B	9.4		55 11	24.6		8.5		46	17.8		8.0		15	58.0	A
8.6		1 26	34.6		8.7		28 7	15.4	F	9.5		13	44.7		9.0		23 15	25.6		9.5		30	50.5	
9.5		26	9.8		9.0		23	54.0	R	9.5		57 1	55.2		8.8		18	20.9		9.3		53	7.0	
8.0		2 9	59.5	F	7.2		29 9	5.5	F	9.0		16	39.3	A	9.5		30	44.7		9.5		55	28.8	
9.5		3 5	15.2		8.5		30 17	28.5		9.2		58 11	29.0		9.2		45	13.4		9.5		47 8	10.8	
9.5		13	32.6		8.2		18	34.9	A	9.5		16	37.5		9.5		51	55.1		8.7		31	38.5	
9.5		18	57.7		9.4		31 12	49.6		9.5		43	45.2		9.5		53	55.8		9.5		32	32.9	
8.4		5 16	35.5	A	8.2		26	20.4	F	9.4		48	59.3		9.2		53	34.2		9.5		47	25.2	
9.5		6 15	23.9		9.5		28	17.9		8.5		59 55	56.5	R	9.5		24 1	15.7		9.5		51	16.4	
7.9		18	35.4	A	9.4		32 42	59.9		9.5	23	1 11	18.6		9.1		5	38.9		9.5		58	16.4	
9.5		56	48.7		6.8		33 22	23.5	F	8.5		37	30.0	R	9.2		25 17	19.3		7.9		49 15	56.5	A
8.8		7 7	44.9		9.3		56	7.4	R	7.8		3 14	17.2	R	9.1		37	8.4		9.3		50 20	37.8	
9.2		45	14.9		9.4		34 3	20.0	B	8.5		34	15.3		9.5		26 10	45.6		8.7		31	10.5	A
9.5		8 4	16.5		9.4		4	12.9		9.5		42	41.5		8.5		36	33.1		9.5		35	38.2	
9.5		43	1.8		9.5		13	53.3		9.1		4 47	14.9		9.4		50	32.5		9.3		51 10	6.4	
9.5		46	33.8		9.0		29	11.3	R	9.5		57	49.5		9.5		27 12	1.1		9.0		13	17.0	
9.5		9 10	0.0		9.2		35 47	4.1	B	9.3		5 9	7.4	B	9.5		39	54.6		9.5		17	3.6	
9.5		43	12.4		7.1		57	45.1	B	9.0		11	7.4	B	9.3		29 14	47.8		9.0		50	50.5	A
9.1		10 11	3.9		9.4		36 22	47.5		9.3		6 27	12.5	R	8.3		30 13	45.7		9.3		52 11	10.6	
9.5		15	18.5		9.4		37 3	31.0		9.0		7 3	23.8	R	9.5		15	57.7		9.5		46	21.8	
9.5		26	16.8		9.3		38 26	7.4	B	9.5		14	36.6		9.5		32	23.7		7.9		58	8.3	R
9.3		11 14	58.8		9.4		54	1.9		9.5		17	59.4		8.7		31 7	12.4		9.5		53 15	0.0	
9.5		36	56.0		9.3		39 21	43.7		9.5		8 12	13.5		9.5		51	13.7		9.2		28	50.1	
9.4		12 13	43.2		9.4		23	29.5		9.0		14	1.0	R	7.8		32 16	41.3	A	8.2		54 14	8.0	
9.2		29	6.0		9.0		32	27.0	A	9.5		41	36.2		9.5		22	37.9		9.5		17	17.0	
9.2		35	14.2		9.0		40 29	28.5	A	9.5		49	2.2		9.5		39	55.5		7.0		27	30.0	A
8.7		57	10.2		8.6		41 14	29.5	A	9.5		9 0	49.9		8.4		48	22.7	A	6.9		36	37.9	A
7.0		57	24.0	G	9.5		15	18.2		9.5		38	10.1		9.1		33 15	40.2		9.5		55 8	5.7	
9.4		13 5	25.3	B	9.4		42 41	27.7	B	9.5		41	6.2		9.0		34 1	35.4		6.3		14	17.4	A
9.3		10	52.5	B	9.2		43 11	10.6		9.2		46	1.9		9.5		14	50.4		8.5		15	17.5	R
9.5		21	57.5		9.2		25	22.1		9.5		10 13	44.5		9.1		27	26.3		9.4		16	22.6	
9.5		14 16	8.3		9.2		29	46.8		9.4		11 4	29.3		8.5		40	42.0		9.5		56 8	38.7	
9.5		20	29.0		8.3		56	13.4		9.0		18	41.0		9.5		35 4	56.1		9.5		10	15.8	
9.4		23	37.5		9.0		44 0	27.0		8.8		20	24.8	R	9.5		31	11.0		9.5		19	54.8	[illegible]
9.4		50	49.8		7.0		31	45.9	A	9.0		22	8.5		9.5		36 22	40.0		6.4		26	54.0	A[illegible]
8.0		15 32	41.6	B	3.8		32	25.9	A	9.5		34	35.2		9.2		26	40.3	B	8.2		57 23	2.1	A[illegible]
9.5		43	18.2		9.5		45 17	48.6		9.5		12 5	21.3		7.7		37 7	44.6	A	7.8		32	42.4	
9.3		50	51.7		9.1		30	40.4		9.5		13 31	2.0		9.5		8	45.3		9.5		38	30.1	
9.2		16 34	54.7		7.3		38	58.2	B	7.8		37	37.6	R	9.4		10	57.7		[illegible]		44	2.0	
8.5		42	35.0		9.5		46	47.2		9.5		14 7	17.5		9.5		38 5	50.2				50	43.[illegible]	
6.3		17 28	57.6	A	9.2		53	29.5		9.5		15 1	18.9		9.3		50	16.8				18	4[illegible]	
9.2		18 6	53.3	A	9.2		56	37.0		9.5		16 9	19.9		9.3		52	11.3				5	27	
																						4	3[illegible]	

Zone +66°

1—40					41—80					81—120					121—160					161—200				
	0h		+66°			0h		+66°			0h—1h		+66°			1h		+66°			1h—2h		+66°	
m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′		m	h	′ ″	′	
8.4	0	1 6	29.3	A	9.5	0	27 6	34.3		9.5	0	50 47	56.5		9.0	1	19 23	22.0		8.4	1	38 56	56.7	A
8.6		24	6.6	A	9.5		11	44.1		9.0		51 0	12.0	B	8.9		21 2	49.3		9.4		39 30	42.8	
9.5		58	25.2	B	7.3		29 19	50.6	L	9.3		2	30.9		9.5		22 6	29.4	B	9.5		40 7	42.8	
9.5		2 5	17.8		8.7		38	56.7		9.4		16	8.5		9.3		9	46.2		9.3		22	54.9	
9.1		29	39.6		9.5		30 31	14.2		9.3		52 1	23.5		9.5		24	45.7		9.4		33	26.1	
8.5		35	29.2	A	9.5		31	26.5		9.2		9	8.2		8.0		27	30.0	L	8.7		41 33	20.6	A
9.0		3 5	20.4		9.0		52	0.4		9.5		22	51.1		9.5		23 21	45.8		9.1		46	1.0	
8.9		16	27.3	A	9.3		31 20	55.4		9.2		53 38	32.4		9.5		31	8.9		9.2		42 45	31.8	
9.3		4 20	27.3		9.5		26	26.0		9.0		54	9.8		9.4		49	44.0		9.2		43 27	49.2	
8.5		5 24	12.0		9.2		28	16.2		8.8		54 16	8.2		9.5		51	30.0		9.3		46 52	57.1	
9.5		7 26	20.5		9.5		32 29	38.3		9.5		55 16	8.8		9.1		24 36	23.5		8.3		47 37	51.7	A
9.0		8 18	0.7		9.5		29	3.4		9.5		56 20	32.0		9.5		53	47.2		9.5		45	5.3	
9.2		9 2	14.6		7.8		33 8	59.0	B	9.5		58 42	30.5		9.5		25 24	19.2		8.6		54	31.0	A
9.5		31	49.8		9.5		39	10.8		8.4		46	42.7	A	7.3		58	52.1	A	9.2		48 7	8.4	
7.2		11 27	29.8	A	8.5		35 41	12.7		9.4		58	2.0		9.2		26 5	7.6		7.2		15	20.3	A
9.4		33	12.5		9.4		42	45.1		9.5		59 56	56.9		9.5		34	41.7		8.0		49 8	40.5	A
9.3		12 23	52.1		7.6		54	45.7	B	9.2	1	3 18	51.5		9.4		55	28.9		9.5		50 29	0.8	
9.3		42	19.0		6.8		58	21.5	L	9.4		5 17	26.5		9.5		27 14	34.9		9.3		51 21	25.2	
8.1		57	51.6	B	9.1		38 6	2.3		9.4		19	31.9		8.0		18	51.5	A	9.5		52 27	41.2	
7.0		13 23	12.1	B	9.0		34	6.6		9.5		6 57	44.0		9.5		31	34.5		9.5		53 3	55.3	
9.4		24	12.0		9.5		40 6	31.9		9.5		7 11	47.2		9.3		37	23.5		8.6		54 3	58.8	A
9.3		26	56.5		9.3		17	47.7	A	9.4		44	57.0		9.3		43	14.2		9.1		5	59.4	A
9.5		30	43.1		9.3		25	42.7	A	8.5		9 58	26.0	A	9.5		51	8.0		8.9		55 42	56.5	A
9.5		14 36	44.5		9.2		41 22	22.0		9.5		10 32	40.8		9.5		29 58	49.6		9.4		55	39.9	
9.4		15 20	19.0		9.5		42 21	3.0		8.0		39	27.5	A	7.4		30 53	10.9	B	8.8		56 20	17.3	
9.0		51	29.8		8.9		31	47.1	A	8.9		56	56.8		9.5		31 30	55.0		9.5		57 40	25.6	
9.5		16 12	56.3		9.4		44 16	7.7		9.5		11 43	28.0		9.1		30	40.8		9.5		58 53	27.1	
9.2		17 0	21.9		9.4		47	8.2		9.5		49	34.4		9.2		31	34.6		9.5		59 6	42.3	
9.4		14	5.7		9.0		45 35	34.9	A	9.5		12 18	42.7		6.8		41	3.4	B	8.5	2	0 21	23.1	A
9.5		40	39.2		9.2		46 56	3.6		9.2		40	2.1		9.4		32 21	31.1		9.5		52	29.6	
9.1		18 41	44.0	A	9.0		57	34.9	A	8.8		13 58	41.2		9.0		41	16.9		7.7		2 53	2.7	B
9.3		21 42	14.3		9.2		59	6.9		9.4		59	23.5		8.1		33 36	50.1		9.0		4 4	47.3	
9.5		23 6	21.9		9.0		47 25	7.5		9.5		16 43	30.0		9.1		39	8.2		9.3		6	59.7	B
9.5		28	26.9		8.8		48 43	57.7		8.0		47	18.7	A	9.4		35 18	47.3		9.4		9	53.3	
8.2		43	21.4	R	8.8		51	54.8		8.5		49	59.6	A	9.5		53	12.5		9.3		9	54.9	
9.5		24 35	58.0		9.3		49 2	41.7		8.1		17 1	12.8	A	8.5		37 19	28.8	A	9.4		22	32.0	A
9.5		25 6	30.6		9.3		4	11.8		9.1		53	49.3		9.4		27	30.1		9.1		34	1.8	
9.4		26 8	31.3		9.4		23	2.4		9.0		55	21.6		9.5		43	59.4		7.4		5 10	36.5	A
7.5		10	42.8	L	8.3		27	39.5	R	8.5		18 11	25.0	A	8.9		38 22	4.0		9.5		31	11.8	
9.5		27 1	47.8		9.5		49	46.2		9.5		55	8.9		9.4		39	48.9		9.2		7 40	12.8	

201—260					261—320					321—380					381—440					441—500				
	2ᵘ—3ᵘ		+66°			3ᵘ—4ᵘ		+66°			4ᵘ—5ᵘ		+66°			5ᵘ—6ᵘ		+66°			6ᵘ—7ᵘ		+66°	
m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′
9.0	2	8	0	43.8	A	9.3	3	9	23	7.9		9.3	4	9	8	56.8		9.4	5	1	16	8.9		8.5	6	10	38	35.0	
9.4		9	7	49.7		9.0		10	0	39.8	A	9.5			56	41.5		9.3			26	0.1	A	9.5		11	47	1.1	
9.0			39	10.6	A	9.0			31	6.7		9.0		11	22	39.9	A	8.8		2	18	30.5		9.4			54	3.1	
9.5		10	35	56.6		9.3			32	36.5		9.3			25	32.6		9.4		4	58	1.6		9.3		13	7	19.3	
9.3		11	4	24.2	A	7.5			58	55.0	A	8.1			50	37.1	A	6.8		5	54	34.0	A	9.0		16	12	41.8	A
8.1			18	10.7	A	8.8		11	41	38.1	A	9.2		13	13	17.3	B	9.1		6	51	38.9		9.5		17	59	58.1	A
9.5		13	18	29.6		8.5			46	45.4	A	8.8			34	49.6	A	7.8		7	0	52.1	B	9.4		18	8	28.6	B
8.6			22	11.3		9.2		17	37	16.9		9.1		14	30	10.0	A	8.3			35	53.9	B	9.5			45	27.8	
9.5		14	41	47.3		7.5		18	34	55.0	A	9.0			36	20.4	A	9.3			41	53.9	B	9.5			46	11.3	
9.3		16	27	58.6		9.0			53	53.7	A	9.5		16	24	45.9		8.8			46	32.0	A	9.5		19	43	5.1	
9.5			39	18.4		9.1		19	5	53.9		8.7			49	16.4	A	8.0		8	11	2.6	A	9.0		21	45	8.1	A
9.5			49	0.8		9.4		20	41	39.8		9.4		17	34	7.1		9.1		10	6	51.7		9.5		22	39	38.5	
4.7		17	12	44.6	A	9.4			41	11.1		9.4		20	57	58.7		9.3		11	53	18.7		9.5		23	36	3.5	B
8.8			43	46.3	A	9.3		21	26	19.6	B	9.1		23	16	16.9		9.1		13	1	34.9	A	9.5		24	21	4.3	
9.0		18	17	45.3	A	8.9			28	47.1	B	8.0		24	33	55.2	A	9.4			8	28.0		7.5			47	16.6	B
8.9			38	55.3	A	9.5		22	1	11.5		8.8		25	21	35.1	A	9.3			22	11.9		9.4		25	28	43.7	A
9.5		19	32	26.2		9.0		25	52	59.9		9.2		26	59	16.1		9.4		15	1	40.8		9.5		26	43	29.9	A
9.5		21	25	30.5		8.8			54	11.6		9.1		27	18	15.2	B	9.0			22	5.0		8.7		27	8	58.3	A
8.1		22	15	46.8	A	8.5		27	13	28.7		9.1			19	58.9		8.0			40	6.5	A	9.2			15	3.1	A
9.4			45	56.3		9.2			20	11.6		7.8			38	59.8	A	8.8		19	6	14.6	A	7.0			48	19.3	A
9.1			46	38.0	A	9.5		29	33	27.8		9.1			45	54.5		7.0		22	26	35.5	B	9.4		28	8	32.9	A
9.5			59	56.7		9.5			37	29.7		9.5		28	2	35.6		9.0		27	34	52.0		9.5		29	19	2.6	
7.0		24	11	50.2	A	9.2		32	18	3.2		8.8			17	26.7		9.2			52	27.0	B	7.7			27	25.4	A
9.2			43	19.3		6.2			20	44.9	A	9.2			42	51.0	A	9.5		28	29	6.5		9.3		32	3	51.1	B
9.2		26	11	47.3		8.5		33	31	17.9	A	8.0		29	44	28.7	B	8.7			45	26.2	S	9.2			56	23.5	
9.4			21	37.0		9.4		34	13	53.8		9.1		30	35	41.9		7.8		29	5	32.8	B	9.3		34	52	30.5	B
8.4		29	56	37.0		9.1		35	21	21.8		9.0			50	39.8		9.4			27	53.7		8.5		35	48	25.8	B
9.5		32	12	59.6		9.0			32	32.8	B	8.6		31	31	56.4	G	9.5		34	38	50.4	A	9.1			51	4.4	
9.5		34	12	32.9		9.5			41	4.2		9.5			46	51.2		9.2		35	13	0.1	A	8.5		39	2	35.9	
9.4			58	56.8		7.7			58	41.9	G	9.4		34	33	26.6		8.7		37	37	49.1	A	8.7			11	20.2	B
9.4		35	4	35.3		9.2		38	15	59.1		8.5			52	45.2	A	9.3		40	6	5.0		9.5			55	43.2	
8.8		36	24	45.1		9.4			22	30.8		9.0		35	37	41.4	A	9.3		41	49	42.8		8.8		40	12	9.3	
8.5		37	36	20.1		9.5		40	5	38.1		7.7			41	14.9	A	6.7		42	52	3.7	B	9.4		41	32	16.2	
9.5		39	31	1.8		9.1		41	22	59.0		9.0		36	16	20.7		9.5		43	46	19.8		9.5		42	5	52.5	
9.5		41	38	15.7		9.4			54	28.3		9.4			18	55.0		9.1			54	32.0		8.8		43	36	4.0	
9.0		42	41	33.3	A	9.4		42	44	27.4		9.4			33	54.1		9.1		44	32	46.8		9.3		45	26	32.9	
9.5		45	52	51.7		9.5		45	31	6.2		8.0		37	30	13.8	A	9.2		45	31	58.4		9.4		47	2	48.7	
9.5			58	25.0		9.3		46	13	47.0		5.0		39	39	3.5	A	9.5			40	22.6		9.5		52	11	55.7	
9.5		46	13	45.4		9.3			15	36.1	B	9.4			58	0.1		7.0			49	59.9	G	9.0		53	6	11.3	
9.5		48	21	39.5		9.3			18	44.1		8.2		40	2	11.0	A	7.7		47	18	51.7	G	8.0		54	11	16.8	A
9.5		53	0	17.0		9.0		47	18	38.1		9.0			53	27.0	A	9.5		49	5	4.6		8.3			26	11.3	A
7.8		54	0	50.3	F	9.4		50	55	2.9		8.3			53	41.3	A	9.0			51	39.3		9.2			50	59.8	A
9.2		56	10	55.1		9.2		53	25	52.4		9.4			59	56.8		8.2			56	56.7	A	8.7		55	17	5.0	A
8.0			16	21.3	F	9.5		55	34	59.9		9.5		41	42	37.8		9.5		51	16	52.5		8.3			36	11.1	A
8.8		57	14	31.4		9.3		56	4	25.5		9.5		42	1	29.0		8.1			20	15.8	A	9.0			43	29.4	A
8.0		59	7	11.5	A	8.1			13	27.0	F	9.5		43	39	34.5		9.0		54	1	15.4	A	9.1		56	20	32.0	A
8.3			45	50.9	A	9.0			46	19.6		9.5		44	53	11.4		9.4			6	56.3	A	7.7		58	8	50.0	A
9.2	3	1	27	42.4		9.5			59	46.7		9.5		45	26	55.8		9.4			35	43.2	A	9.4		59	57	52.5	A
8.9			36	28.2	B	9.3		57	51	22.6		9.5		47	42	26.1		9.4			39	52.1	A	9.4	7	0	16	4.9	B
9.3			40	59.5		9.2		58	49	10.3		7.0		48	11	37.3	A	9.4		55	20	17.4	A	9.4			35	47.7	A
8.0		4	6	31.6	A	9.5	4	0	13	37.9		9.3			38	57.5		9.5		56	5	59.5		8.5		2	10	29.5	
9.2			9	32.0	A	8.7			17	8.8		9.3			55	57.2	B	9.4		57	8	12.4		9.5		3	43	22.2	
7.8		6	30	41.4	F	9.2		1	13	43.3	B	9.5		50	16	44.8		9.3			22	13.7	B	7.5		4	31	59.5	L
8.6		7	2	28.7		9.2			34	3.4		9.4		51	47	17.7		9.1	6	0	28	12.4	A	9.5		6	32	20.1	
9.2			22	42.8		8.6		3	32	35.8	A	9.5		55	29	51.2		8.0			52	10.7	A	9.5		8	17	18.7	
9.1			50	23.3		7.4			41	43.7	A	9.2			41	33.0		9.1		1	1	9.9	B	9.4			18	29.8	
9.4		8	48	36.6		9.5		6	21	23.0		9.0		56	39	16.8		8.5		4	17	40.8		9.4			38	31.7	B
9.0			48	38.3		8.6		8	14	55.8	B	9.4		59	28	40.4	A	9.5			37	7.0		7.3		10	21	5.0	A
9.4			53	28.9		9.5			18	39.3	B	9.3			44	15.3	A	8.5		5	49	40.3		9.4		11	7	50.2	B
9.2		9	9	14.1	B	9.1			32	6.7		9.0	5	1	5	1.6	A	9.5		9	28	27.6		9.5			9	48.2	

501—560					561—620					621—680					681—740					741—800				
	7ʰ—8ʰ		+66°			8ʰ—9ʰ		+66°			9ʰ—10ʰ		+66°			10ʰ—11ʰ		+66°			11ʰ—13ʰ		+66°	
m	h	′	″	′		m	h	′	″	′		m	h	′	″	′		m	h	′	″	′		m	h	′	″	′	
9.0	7	11	16	29.1		8.3	8	22	18	52.8	A	8.0	9	21	20	27.0		7.9	10	37	49	21.5	A	9.4	11	53	12	24.1	
6.2		13	1	37.2	A	9.2			52	23.1	A	9.5		22	40	25.0		7.8			58	12.7	A	6.8			54	55.8	B
7.3			37	46.7	A	8.9		24	37	23.3	B	7.3		23	24	2.4	A	8.7		38	21	58.5	A	9.5		55	59	40.8	
9.5			46	8.6		9.5		26	8	25.2		9.4		27	48	51.0		9.0			28	13.7	A	8.9		56	21	0.6	B
9.5		14	13	2.0		9.4			29	27.7	B	9.3		28	18	57.1	B	9.5		42	17	25.5		9.5			48	11.3	
9.5			17	3.8	B	9.5			35	43.3	B	8.8		29	14	48.0	B	9.5			46	25.5		7.6	12	1	17	9.4	B
9.5		16	3	48.5		8.8		27	45	33.4	A	9.5		31	41	23.5		8.3		43	53	11.3	A	9.5		2	50	17.8	
6.7		17	7	24.9	A	9.3		28	34	30.5		9.2		33	43	4.1	A	9.3		44	27	16.7		8.4		3	20	28.2	B
9.5		18	49	30.0	B	9.5			35	14.3	B	9.3		34	24	1.5		8.0		46	13	29.9	A	9.5			48	50.7	
9.5		19	46	48.5		9.3			57	53.4	B	7.2			29	17.1	A	8.0		47	37	28.5	A	8.3		5	34	40.3	A
8.6		20	53	40.1	A	8.3		29	24	36.4	A	8.8			44	34.7	A	8.0			38	3.9	A	6.8		7	1	54.9	B
7.3		21	44	46.5	A	9.4		32	59	20.8	B	9.4		35	9	10.0	B	9.5			58	22.5		8.5		11	3	55.8	A
8.0		22	26	59.7	A	9.5		33	29	27.5		9.3			32	30.2		9.5		48	30	5.9		9.5			56	27.1	
6.5		24	13	31.3	G	9.4			57	21.0	B	9.3		36	38	58.9		9.5		49	49	14.1	B	8.2		12	3	11.3	A
9.0			16	27.2		7.7		34	47	43.8	A	8.8			48	8.3	A	9.3		50	35	43.2		9.5			17	2.0	
9.0			25	52.1		9.5		36	7	34.5	B	8.8		37	15	27.4	A	8.3		56	4	36.4	A	9.5		14	2	27.1	
8.5		25	41	36.1	J	9.5			43	16.9		6.7		38	59	15.6	A	7.0			54	39.4	A	9.5		15	9	30.0	
8.5			49	21.0		9.5		37	15	20.6		9.5		39	11	4.8		9.5		58	4	8.0		9.5		19	51	0.2	
8.1		27	35	33.2	B	9.4			22	59.4		9.4		43	38	49.7		8.5			7	31.0	A	9.5		20	48	3.5	
9.4		28	9	9.7		7.8		38	48	59.1	A	8.4		44	22	26.9	A	9.0			21	37.9	A	9.5		21	23	23.1	
9.0		29	33	30.3		9.4			51	55.8	B	9.1			22	56.0		9.4		59	28	24.6		7.5			44	16.8	A
8.9			54	47.0		9.0			58	39.3		8.4		46	58	35.7	A	9.3			43	16.8		9.3		23	45	53.6	B
9.2		33	3	4.1	A	9.5		39	41	20.6		9.5		47	49	57.9		8.5	11	1	52	49.9	A	6.5		24	24	41.8	A
9.0			58	40.4	A	9.5		41	25	1.2		8.4		48	13	0.9	A	8.7		2	23	48.2	A	9.0		27	56	2.0	
9.2		36	38	8.4	A	9.4		42	50	10.7		8.9		49	52	47.0		8.7			29	48.9	A	8.8		30	18	2.1	A
9.0		37	31	38.4		9.5			53	13.4		8.8		54	0	42.0	A	9.2			53	53.7	A	9.0		31	43	27.6	A
9.5		38	40	21.7		7.5		44	14	3.9	A	9.3		55	26	16.7	A	9.2		4	28	30.1	B	9.0		35	15	6.7	
8.5		40	53	50.6	A	9.3		46	1	7.5	B	8.3			42	1.4	A	7.9			37	29.6	A	7.3		37	10	43.8	F
9.5		41	54	16.4		7.0			1	33.3	G	9.3		56	9	22.0		9.5		5	43	53.6		9.0		38	6	28.6	
8.8		42	27	57.2	A	9.5			50	47.6	B	7.3		57	11	43.1	A	9.2		7	28	2.4	B	9.2			8	43.2	
9.1		44	56	5.7	A	9.5		48	38	12.6		9.5			56	5.4		9.0			28	34.5	A	8.9		39	17	55.1	
8.5		49	19	35.2		9.5		51	42	13.0	B	9.1	10	0	26	15.9	B	9.0			36	42.3	A	8.8		41	57	13.3	A
8.5		50	37	54.6	F	9.4		53	49	49.8		9.5		2	30	49.7		9.3		9	11	2.5	B	9.5		44	45	38.5	
9.5		51	28	42.3	B	9.3		54	22	54.5		9.5		3	20	26.0		9.5		10	42	38.4		9.4		46	25	32.0	
9.5		52	40	42.5		9.4		55	15	57.7		9.4			22	44.6		8.8			54	11.0	A	9.0		47	34	34.5	A
8.8		54	40	20.4	A	9.5			53	46.1		9.4			41	9.3		9.5		11	29	28.1		9.3		48	4	3.0	A
7.0		55	56	4.3	A	8.4		58	2	25.0	B	9.5		8	3	27.0		9.0		12	27	37.5	A	9.5			52	9.5	
7.8		58	8	25.4	A	9.5	9	0	25	11.3		9.4			4	3.3		9.1		16	0	5.0		5.0		49	41	14.2	A
8.3	8	0	1	40.6	A	7.7			58	18.7	A	9.5		11	23	58.9		9.0			20	1.6	A	9.4		50	7	2.7	
9.5		1	39	44.0		7.7		1	19	23.2	B	9.5			24	50.0		9.0		17	12	6.5	A	7.3			41	46.8	A
6.5		2	3	36.7	A	9.3			32	17.7	B	9.3			31	47.6		8.7		20	40	21.2	A	9.3		51	18	54.8	B
9.5			24	7.8		8.5			49	29.9	A	9.4			48	20.1		9.5		21	45	37.5		9.5		53	58	33.6	
9.1		4	25	32.2		9.5		3	12	2.4		9.4		13	37	8.2	B	9.2		22	42	40.9		9.5		54	24	9.6	
8.3			53	5.1	B	8.3		5	40	3.8	A	5.0			39	18.1	A	7.2		25	47	3.0	L	9.5			57	34.9	
7.5		10	6	11.6	A	9.0			43	22.0		7.8		14	36	38.7	A	9.3		26	2	44.8		9.3		55	47	43.0	
9.4			31	33.7		9.5		6	33	55.5		9.3		15	11	47.8	B	9.5		28	5	2.1		9.5		56	43	25.3	
9.5			42	57.8		9.2		7	27	18.5		9.5			12	11.4	B	9.3		30	26	9.5		8.7		58	40	39.4	A
8.5		11	16	46.1	A	9.1		9	45	42.6	A	9.3		16	17	45.3	B	9.3		31	13	38.5		9.4		59	37	29.7	
8.8			29	49.0	A	9.3		10	35	31.9	B	9.4		17	30	44.9	B	9.4		32	49	45.3		8.8			56	45.5	A
8.8		12	6	57.0	A	8.3		11	27	45.6	A	9.3		18	21	35.8		8.3		33	37	29.5	B	8.3	13	0	15	26.4	A
9.0		14	33	20.0		9.3			32	25.4		6.6		19	34	21.5	A	8.0		37	31	20.3	A	9.4			38	27.6	B
9.5		15	28	34.7		8.5		13	0	9.8		8.3		22	43	11.3	A	9.4		38	41	31.2	A	9.5			47	56.4	B
8.1			36	41.0	B	9.4			15	34.3		9.4		25	3	11.6		9.5		44	56	47.8		7.8		3	29	20.5	A
9.5		16	39	27.9		9.0		15	1	47.1		9.5		29	27	56.5	B	8.5		46	31	1.1	A	9.5			30	18.1	
9.3			56	4.3		9.3		16	9	16.3	B	9.0			32	16.2	A	9.5		47	9	52.0		9.5		4	34	7.8	
9.5		18	47	12.1		8.6			23	11.7	A	9.4			43	56.7	B	9.4		48	25	39.3	B	8.0		5	19	20.4	A
9.3		21	0	34.9	B	9.3		17	23	40.5	B	9.3		31	10	7.8		6.5			58	2.3	A	9.4		7	0	55.9	
9.5			29	28.8		9.0		18	54	18.5	A	5.2		32	0	27.5	A	9.5		49	2	37.9		9.5			2	26.8	
9.0		22	3	45.6	A	9.4		19	10	10.2		8.5			45	46.6	A	9.5		51	29	18.7	B	9.4		8	5	32.7	
8.5			4	45.0	A	9.4		21	2	49.1		9.5		34	0	56.4		9.5		52	11	29.1		7.5		10	54	28.3	A

801—860					861—920					921—980					981—1040					1041—1100				
	13ᵘ—14ᵘ		+66°			14ᵘ—15ᵘ		+66°			15ᵘ—16ᵘ		+66°			16ᵘ—17ᵘ		+66°			17ᵘ—18ᵘ		+66°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
8.8	13	11	2	25.4	A	7.7	14	35	56	29.6	A	9.5	15	46	25	18.2		9.4	16	52	33	26.9		8.8	17	42	48	48.2	B
9.1			13	52.9	A	9.5		36	59	36.0		9.5		47	50	52.9		8.7		53	12	51.5	B	9.1			54	10.4	B
9.5		15	30	8.3		7.2		37	1	58.2	B	8.0		49	34	51.2	L	9.5		55	22	30.7		9.2		43	11	6.0	B
9.5		16	47	55.3		9.1			31	59.8	A	9.2		52	26	20.7		9.2		57	9	26.4	B	9.5			36	1.0	
8.5		17	59	31.0	B	9.1		39	25	19.8	A	9.0		53	58	58.7		9.5			31	35.9		9.5			37	1.8	
9.4		18	7	32.8		9.5			29	46.3	A	9.5		55	22	8.4		9.4		59	57	48.5		9.2		44	21	38.7	
7.8		19	51	55.5	A	8.2		40	23	30.1	A	8.0		57	48	27.5	A	9.5	17	0	27	16.1		8.6			55	30.6	
9.5		24	47	24.9		9.5		42	31	50.3		9.5		58	22	15.3		9.5		1	8	29.7	A	9.5		45	52	51.3	
9.5		27	39	51.9	B	8.9		44	23	21.3		9.4			36	33.5	A	8.3			58	43.5	A	8.9		46	31	33.7	A
9.0			52	5.2	A	8.0			58	5.4	B	8.9	16	1	27	6.5		8.5		2	1	30.7	A	9.0			32	13.2	
9.2		28	41	41.0		8.8		45	47	51.6		9.5			33	15.8		9.2		3	5	21.8	A	8.5		48	0	6.6	A
9.5			54	33.7		8.3		47	17	9.4	G	9.5		2	16	6.0		9.0		4	47	48.0	A	9.5		51	10	59.4	
9.2		30	53	50.0	A	7.3			47	15.3	G	9.5		3	3	20.6		9.5		5	4	29.4		9.5			15	49.5	
8.8		32	56	23.9		9.1		49	19	57.3	A	9.1			14	50.6		9.1			20	1.8	A	9.5			20	53.1	
9.5		33	29	11.7		9.5			21	16.0		9.2			54	3.0		9.4		6	35	8.7	A	9.2		52	39	14.5	A
7.5		37	37	0.9	A	8.5		50	36	9.5	A	9.4		4	50	42.3		9.2			53	28.2	A	9.5			40	44.6	
8.8		38	14	7.2	A	9.1		54	23	42.9		9.0		8	32	12.8	A	8.7		8	48	48.2	A	7.5			56	26.5	A
8.6		41	21	31.5	A	4.5		55	17	31.1	G	8.8		9	53	16.5	A	9.4		9	28	52.3	A	9.4		53	10	17.5	
9.1		45	5	0.9		9.1			51	47.3		9.5		12	4	55.1	B	8.2		10	47	25.9	A	9.5		54	31	18.5	
9.0			30	43.3	B	9.5		56	44	31.5		8.7			27	29.7	A	9.4		11	1	20.4	A	9.0		56	10	56.7	A
8.0		46	23	41.5	F	9.5			48	23.3		8.0			36	58.8	G	9.5			58	5.8	A	9.5		57	5	11.1	
8.9		48	12	26.3	A	7.2		57	39	3.1	A	9.2		13	12	3.3	A	8.5		12	41	33.2	A	9.2			39	13.6	
9.5			57	13.5		9.5		59	21	41.4		9.5			47	59.1		9.5		13	22	4.8		8.5			40	18.7	
8.6		51	21	49.7	B	9.0			29	16.0		8.0			48	45.2	A	9.4			31	15.1		9.0			49	26.3	
7.5		52	25	4.7	F	7.3	15	0	8	33.1	G	9.3		15	27	51.4	A	8.3		14	56	14.1	A	9.1		58	11	39.4	B
9.5		53	3	2.8		7.5			42	20.8	G	9.2			58	10.7	A	8.4		15	3	48.9	A	neb			37	38.3	B
7.2		54	47	49.3	F	5.8		1	46	29.1	A	8.5		19	58	31.2	A	8.5			45	47.1	B	9.5			46	4.0	
8.4		56	37	46.4	B	9.4		2	28	10.6		9.0		20	56	16.1	B	9.5			51	46.1		9.5		59	14	3.1	
8.6	14	0	19	2.5	B	8.3		4	20	17.4	A	9.5		21	47	59.9		9.4		16	18	20.0		9.5	18	1	24	18.0	
9.0		1	49	17.8	B	6.5		6	11	20.8	A	9.4		22	47	57.2	B	9.5			35	11.9		9.4			28	20.8	
9.5		3	3	54.1		9.5			47	1.8		9.3		24	0	53.0		9.3		18	8	1.5		9.5		2	5	12.0	B
8.7			27	6.1	A	9.3			52	32.6	A	9.5			16	10.1		9.5			53	35.3		9.5			32	54.3	
9.4			32	28.6		9.4		9	6	1.8	A	9.5			39	5.8		7.0		20	55	41.7	A	9.3		3	8	27.8	
7.8		5	43	14.9	A	7.0			20	10.6	A	8.9		27	20	25.4	A	9.2			56	35.2		9.0			10	19.4	A
9.4		6	28	16.8		8.9		10	12	44.9	A	9.4			22	24.8	B	9.3		23	41	55.5		8.9			48	40.3	
9.3		9	20	55.6		8.9			20	43.4	A	9.5			22	39.2		9.5			59	27.7		9.5		4	10	53.7	
9.5		11	20	50.2		9.0		11	6	18.9	A	9.5			55	17.5		9.5		24	51	24.2		6.5		5	20	55.6	A
9.4			26	14.7		8.0		12	59	30.2	A	8.8		30	51	32.7		9.5			53	49.1		9.5			33	53.4	
9.4			34	8.2	B	9.5		14	28	57.6		9.2		33	11	19.5	A	9.4			55	45.7		9.5		6	48	8.3	B
9.5		12	19	12.6		8.9		16	54	36.4	L	8.8			12	29.7	A	9.5		25	0	41.2		9.3		7	1	20.8	
8.7		14	9	57.0	A	8.8		17	4	47.9		9.4			36	24.4		9.2			31	3.5	A	9.2			16	42.0	A
7.0		17	48	0.7	F	8.9			17	11.4	B	8.9			41	36.2	A	9.2		27	38	22.1	B	9.0			20	41.3	A
9.5		19	14	55.7		9.3			23	15.2		9.2			50	32.2	A	9.5		28	57	53.4		9.4			55	3.2	
9.1		20	24	2.6	A	8.5			23	30.0	L	9.5			51	21.9		8.3		29	27	0.3	A	9.5		9	18	11.0	
9.5			41	0.7		9.5			37	1.7		9.4		36	26	2.8		9.5			52	18.9		9.4		10	22	40.7	
9.1		22	17	32.1	A	9.0			43	46.0		9.4			29	55.3	A	9.5		31	24	52.4		9.4		11	3	5.7	A
6.8			27	38.4	A	9.3		18	57	29.0		8.7		37	28	30.7	A	9.3			32	17.7	B	7.1			42	5.7	A
9.4			54	29.1	A	9.0		19	56	34.9		9.0		38	23	28.7	A	9.5			36	39.1		9.0		12	37	4.3	A
7.7		25	2	59.1	A	9.5		23	58	37.4		9.0			32	12.1	A	9.3			38	35.6		7.8		13	47	25.5	A
9.4		26	3	14.9		9.5		25	51	35.0		9.2		39	14	6.7	A	9.5			42	29.6		9.5		15	1	5.7	
9.5			47	43.4		9.5		27	1	50.8		9.4			23	36.1	A	9.3			57	26.7	B	9.5		16	2	28.2	
9.0		27	18	29.6		9.3		31	12	6.0		9.5		41	3	54.8		9.5		32	31	16.5		9.5			8	23.7	B
9.2		29	51	15.9	B	9.4		33	0	46.0	B	9.4		42	43	58.3	B	9.2			53	18.7	B	9.5			9	26.1	
9.5			52	51.7		8.9		36	33	30.5		9.2		45	23	25.3	A	8.1		34	2	38.8	A	8.6			11	59.4	A
6.7		30	32	1.2	A	6.8		37	2	15.3	L	8.0		46	21	17.6	A	8.5		35	23	14.8		9.5			35	0.2	
7.3		31	52	36.8	A	8.9		39	8	18.7		9.5		48	23	45.5		9.0			52	50.8	A	9.0		18	32	18.0	A
9.5		32	46	13.6		8.8			57	50.8	B	9.5			33	49.9		9.0		37	29	55.1		9.1			33	7.6	A
9.5		33	7	8.1		8.1		44	37	0.7	A	9.0		49	1	7.2		9.4		39	38	49.6		9.3		19	1	59.5	
9.1			10	1.2		8.7			46	18.7	A	9.5		51	23	47.0		9.5			52	41.8		9.2			18	44.4	
9.1		35	13	8.0		7.9		45	14	18.2	A	9.5			37	8.2		9.4		40	6	51.3	B	8.5			50	42.9	A

1101—1160					1161—1220					1221—1280					1281—1340					1341—1400				
	18ᵘ—19ᵘ			+66°		19ᵘ			+66°		19ᵘ—20ᵘ			+66°		20ᵘ			+66°		20ᵘ—21ᵘ			+66°	
m	u	′	″	′	m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.3	18	22	32	13.2	8.6	19	6	38	4.6	A	9.3	19	34	45	31.0		6.2	20	16	5	23.3	B	9.4	20	54	35	4.6	
9.1		24	30	18.6	8.7		7	21	18.7		9.2		35	23	2.5		9.5			37	32.0		9.2			38	31.7	
9.3			44	10.5	9.3			35	43.6	B	9.1		37	0	38.1		9.4		17	9	47.6		7.7		55	13	11.1	A
9.5		25	11	49.8	9.3			48	47.6	B	9.5			53	39.1		9.5			42	3.5		8.7			21	17.9	A
9.2		26	38	25.7	9.3			50	42.6		7.9		38	54	7.8	B	9.0		19	1	58.2		9.5		57	16	1.8	
8.6		27	34	40.7	9.1		8	16	2.7	A	8.4		39	45	22.3	L	8.8			20	14.1	A	9.3			33	9.4	
9.5		28	18	19.8	9.2			41	38.8		8.7			56	36.1		9.5			50	40.8		9.5			37	20.8	
8.7		30	56	1.0	J	9.5		9	1	15.7		8.8		41	10	15.5		9.2		20	23	40.9		9.3		58	41	32.7	
9.1		31	9	54.3	A	8.0			5	53.0	B	9.5			15	8.2		9.1		21	19	34.7	A	9.4		59	7	12.6	
9.5			14	56.3		9.5			14	37.3		9.5			34	27.4		8.7			21	32.1	A	7.6			20	8.5	A
8.9			34	30.1	A	9.5		10	22	31.3		9.4			44	5.0		9.4		22	31	37.4		9.5	21	0	7	45.0	
7.2		33	48	14.1	A	8.2		11	3	46.0	L	9.5		42	41	49.1		7.3		24	27	39.8	F	9.4		1	2	26.5	B
8.7		34	1	2.0	A	9.5			27	35.1		8.0			52	12.0	A	9.5			28	20.1		9.3			12	46.2	
9.5			23	25.1		9.4			58	44.9		9.5		43	9	27.3		9.1			36	23.6		9.1			30	40.0	
9.5		35	1	58.8		9.5		12	36	20.8		9.4			52	29.1		9.4			43	26.4		9.5			43	33.9	
9.0			40	31.8	A	9.5			53	32.4		9.5		44	49	46.6	B	9.5			45	22.3		9.1			2	6	18.4	
7.4		36	23	47.1	A	9.5		13	33	2.2		9.5			50	57.0		9.3		25	55	44.7		9.0			3	45	31.0	
9.5		37	26	34.2		9.4			42	38.0		9.3			52	13.9		9.5		26	5	37.6		9.3			4	29	46.2	
9.5		38	19	6.3		7.5			51	51.8	A	9.0			53	32.4	B	9.5		27	5	3.6		9.1			5	3	33.9	A
9.5		40	39	24.3		9.5		14	7	2.1		9.5		45	37	13.4		9.5			30	10.9		8.8			35	42.4	R
9.5			53	37.2		8.5		15	17	0.1	A	9.4		46	3	24.0		9.3		28	7	18.5		9.5			48	52.3	
9.5			56	24.4		8.7			29	6.6	A	8.8			9	33.3		8.9			42	15.0		9.5		6	3	12.8	
9.5		41	58	50.5		9.5			50	24.6		8.7			49	13.6		8.8			42	56.8		9.4			5	21.3	B
9.4		42	57	37.9	B	8.2		16	10	52.7	L	8.7			53	55.6	L	9.5		29	18	9.3		9.5			47	21.4	
9.0			59	25.2	B	8.5			51	13.4	A	9.5		47	12	40.6		9.5		30	18	27.1		8.6		7	42	29.3	B
8.6		43	34	27.9	B	9.5			51	10.5		9.0			26	29.9		9.4		31	2	53.0		6.8		8	27	7.3	A
9.4		44	35	40.4		9.5		17	27	55.9		9.5		48	14	24.0		9.1			29	46.3		9.5			52	58.3	
9.0		46	19	30.0	B	9.5			32	16.4		9.5			51	25.5		8.2			36	48.7	B	9.4		9	2	29.6	B
9.4			46	40.4	A	9.4			33	39.5		9.5		49	20	40.2		9.5			36	31.6		9.5			34	57.3	
8.6		47	15	37.2	A	9.5			45	52.0		8.0			26	56.3	L	9.5		34	42	44.4		8.3		10	11	4.9	A
8.7			33	40.1	A	9.5		18	32	14.1		9.5		51	1	26.0		7.4		35	37	59.8	A	8.2			12	51.3	A
8.8			51	23.4		9.5		19	18	42.9	A	8.8			20	41.6		9.1		36	53	46.8	A	9.0			25	12.6	
9.3		49	14	24.4		8.0			19	41.9	A	7.0			47	19.4	A	8.1		38	11	50.3	A	8.8			32	0.6	A
9.1			37	46.0	A	9.5		20	18	59.0		8.4			50	41.2	A	9.0		40	7	16.5	A	9.5		11	13	20.5	
9.0		50	5	8.2		9.1			47	39.2	A	8.5		53	37	16.4	A	8.6			11	24.4	A	8.0			49	0.9	A
9.4			21	46.2	B	9.5		21	14	45.5		6.8		54	10	21.4	A	8.3			16	23.4	B	9.3		12	7	40.3	
9.5			57	13.5		9.5			45	34.5		9.5		55	4	16.3		9.5			16	29.8		9.3			7	51.5	
8.5		51	16	44.0	A	9.5		22	59	40.1		9.4			33	18.0	B	5.5		41	21	7.9	A	9.3			13	15.8	B
9.4		52	12	39.2		9.5		23	21	28.8		9.5			45	20.7		8.9			57	3.1	A	9.1			15	3.3	
9.5			32	33.7		9.3		24	13	41.7		9.5		56	28	46.6		9.5		42	25	28.5		8.0		13	26	45.0	A
9.5			39	50.8	A	9.5			42	18.6	B	9.5			53	20.6		8.6		43	13	29.5	A	9.3		14	14	29.8	
7.5		54	1	57.0	A	9.1		25	17	43.5		8.3		57	27	23.9	F	9.3		44	22	11.5	B	9.5		15	2	32.8	
9.5			10	4.8		9.0			55	40.2		9.5			56	42.6		9.4			22	9.9		7.8			5	1.9	A
9.5		56	2	58.4		9.5		26	17	13.8		9.3		58	21	38.7		9.5			30	11.4		9.0			52	7.8	
9.5			31	15.0		9.5			21	2.1		9.3	20	0	22	7.2		9.2			33	38.9	A	9.4		16	11	31.3	
9.3		58	6	55.6		9.5			57	57.4		8.8		1	20	40.7		7.7			51	45.0	A	9.3			23	3.1	B
8.6			6	7.8	B	9.1		27	22	19.5		8.8			57	38.4		9.5		45	44	41.8		9.2			44	24.6	B
9.5			35	6.1		9.5			45	18.0		9.5		2	9	56.5		9.5		47	15	0.4		9.5			51	41.6	
8.9		59	30	15.8		9.1			58	28.0		8.5		4	22	2.5		9.5			51	31.9		8.3		17	5	10.2	B
9.3	19	0	54	40.1		8.5		29	12	57.1		9.3		5	30	43.7		8.8		48	55	10.3		9.0			8	58.4	
9.2		1	12	54.3		8.5			25	12.0	L	9.5		6	2	17.2		9.5			56	52.5		9.5		18	6	19.5	
9.5		2	26	24.5		9.4		30	6	59.5		9.5			21	48.1		9.5		49	21	6.0		7.6			13	36.2	B
9.5		3	25	22.4		9.5			47	57.5		8.8			56	25.4		9.2			48	28.1		9.4		19	23	39.6	
7.8			38	11.7	A	9.5			56	52.9		9.1		7	19	51.3		9.5		51	11	28.3		9.4			35	43.0	
9.5		5	3	0.0		9.5		31	13	54.8		9.4			35	39.1		9.2		52	2	3.2		8.8		20	24	27.5	B
9.5			32	1.3		8.9			25	6.9	A	7.8		11	20	1.5	A	9.3			7	25.4		8.7			30	27.9	B
9.5		6	3	20.8		9.3			48	25.8		9.5		12	14	2.0		9.5			40	15.1		9.2			41	19.8	
9.5			6	47.5		9.5		32	2	18.1		8.7		13	1	37.8	A	8.8		53	4	22.5		8.8			48	23.5	B
9.4			24	5.5	A	9.5		33	0	22.6		9.5			15	38.4		8.9			23	56.1	A	9.2		21	6	19.5	
8.8			25	10.7	A	9.5			45	3.3		9.5		15	35	2.0		8.7		54	5	25.5		9.0		22	26	26.9	

1401—1457					1458—1514					1515—1571					1572—1627					1628—1683				
	21ᵘ		+66°			21ᵘ—22ᵘ		+66°			22ᵘ		+66°			22ᵘ—23ᵘ		+66°			23ᵘ		+66°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	
8.0	21	22	49	5.8	R	9.4	21	52	57	54.0	B	9.5	22	24	48	57.3		9.1	22	54	44	14.7	B	9.5	23	32	31	47.0	
9.4			58	47.2	B	9.5		53	35	5.2		9.2		25	41	10.4	R	9.1			57	15.9		9.5			59	9.6	
9.5		23	36	12.5	B	9.2			35	21.8		8.9			59	8.6	R	9.5		57	56	45.5		7.8		33	49	45.0	B
7.8		24	51	1.1	F	8.7		54	3	54.0	B	9.0		26	14	48.4		5.5		58	4	26.8	A	8.1		34	32	2.6	B
5.5		25	2	10.3	G	9.0			3	55.8	A	9.5		27	2	42.0		9.1			32	59.7		9.0		35	5	3.1	
9.4		26	17	20.6	B	8.8			5	26.4	A	9.0			31	38.1		8.7		59	33	33.2	A	9.2			15	56.3	
6.5			32	24.6	F	9.5			8	48.5		8.3			49	24.8		8.9			37	18.9		9.5			25	50.3	
9.3			56	21.9		9.0			52	40.2	R	7.4			51	51.4	A	9.5			43	46.5		9.4			47	59.9	
9.3			59	3.3		9.5		56	2	24.4		8.4		28	31	25.8	R	8.8			44	15.5		9.5		36	43	49.8	
9.5		28	37	50.4		9.5			48	37.2		9.4		29	3	7.1		8.6			55	23.8	A	8.9		37	20	0.4	A
9.5		29	6	8.3		9.5			55	34.3		9.1			25	12.0		9.4	23	0	4	8.7		9.5		38	9	49.6	
8.4		30	31	34.9	B	9.5		57	39	58.3		9.1			59	13.5		9.2		1	0	31.2	A	9.5			30	31.7	
9.5			33	49.5		7.9		59	17	33.3	R	8.9		30	30	58.4	A	8.9			11	34.7	A	9.5		39	3	58.1	
9.0		31	10	41.1		8.3			48	24.9	R	9.0			38	24.3	R	9.5		2	28	8.6		9.4		40	19	7.9	
6.7			27	4.7	G	9.3	22	0	24	51.9		8.9			47	17.9	R	8.3		3	27	18.9	A	9.4			22	17.4	
6.7			36	8.2	G	8.1		1	24	4.1	F	9.5		31	44	44.5		6.7		4	15	27.6	A	9.4			54	36.4	
9.2			36	34.9		8.3			55	50.4	R	9.4		33	57	31.3		9.3			17	17.4		9.5		42	46	23.7	
8.9		32	34	35.7	B	8.5		2	41	15.5	F	9.4		34	36	17.9		9.3		5	32	19.9		9.5			53	38.8	
9.4		33	10	29.9	B	9.5		3	16	55.9		9.4		35	14	5.0		8.6			33	15.0	R	9.2			56	50.0	A
9.5			35	26.4		9.4		4	23	41.6		9.4			15	35.2		9.3			55	27.3		7.5		43	21	6.1	A
9.5		34	6	5.8		9.4		5	16	52.2		8.3			27	23.3	A	8.5		6	12	48.9		8.5			23	45.8	A
8.8			27	33.2		9.5		6	4	2.9		9.5		37	8	2.2		9.5			25	41.0		9.5		44	27	1.8	
9.5		35	36	22.4		9.3			52	36.3		9.5			11	9.2		9.5			37	29.3		9.5			49	36.2	
9.4		36	36	16.3		9.5		7	31	20.5		9.4			51	24.0	B	8.5			57	38.6	R	9.2		45	10	21.5	
9.3			38	23.4		9.5		8	20	9.7		8.3		38	42	58.0	F	8.0		7	16	17.6	F	9.5			40	7.6	
9.4		38	9	53.9		9.1			29	40.7		9.1		39	20	9.6	R	9.0			18	8.9		9.1			41	25.6	
9.3			9	29.6		8.5			35	12.1	F	9.4			46	15.5		9.5		8	13	19.4		8.0		47	11	1.0	A
8.8			32	33.9	B	9.5			49	42.1		9.5		41	24	57.4		9.5		10	28	9.9		9.5			34	58.6	
9.0			43	7.3	R	9.5		9	25	40.7		9.5			55	0.0		9.3		12	12	23.8		9.5			43	59.8	
9.5		39	7	55.4	B	9.3			26	35.2		9.5		42	2	56.2		9.5		13	56	9.9		9.5			52	29.3	
9.4			8	18.3		8.8			48	28.0		8.6			41	5.5	R	9.5		15	22	10.6		8.2		48	53	2.7	A
9.5		40	5	40.1		9.0			53	38.5		8.0			53	8.4	F	8.5		16	22	16.5	A	9.5			54	8.5	
9.0			56	50.9		8.2		10	1	12.2	F	9.5		43	1	21.8		8.4		17	19	49.4		9.5		49	24	50.2	
9.5		43	2	9.7		9.4			56	48.9		9.0			5	32.2		9.3		18	22	49.9		8.7		50	19	44.9	B
9.1			14	36.3		9.3		11	6	22.8	R	9.4			15	57.0	B	9.1			50	8.9		8.1			48	27.2	F
9.4			29	25.5		9.5		12	27	15.5		9.4			19	55.6		7.3		19	31	7.3	A	9.3			51	47.7	
9.2			41	29.1	B	9.5			56	49.4		9.5		45	4	12.0		9.4		20	51	57.2		8.7			59	45.6	B
8.7		45	10	36.8		9.5			57	56.8		8.5			22	23.8	B	9.5		22	14	19.4		9.4		51	25	37.7	
9.5			30	50.5		9.5		13	37	6.5	B	9.4			24	57.3		8.3			45	14.5	A	9.5			37	45.8	
9.5			46	4.5		9.5		14	17	46.0	R	9.3		47	16	17.9		9.3			55	5.2		7.8			43	0.4	A
6.4			52	7.2	A	8.8			39	9.4	R	9.5		48	14	37.1		9.5		25	19	19.9		8.8		52	47	7.6	A
9.0		46	6	8.6	R	9.3			41	46.5	R	8.5			27	16.5	F	9.4			27	5.7		9.5		53	9	24.4	
9.5		47	11	8.5		9.5		16	10	23.8		9.5			29	34.7		9.2		26	10	8.6		7.0			34	2.5	A
9.5			19	18.5		7.5			44	14.0	F	8.7		49	9	5.8	A	8.0		27	29	50.2	A	8.7			57	1.5	A
9.4			20	10.5		9.5		18	28	7.4		9.1			11	56.4		9.3			44	57.1	A	9.1		54	14	19.1	
8.2			40	9.5	B	8.3			43	25.3	R	9.4			38	34.2		9.1			56	7.6		9.5			25	41.6	
9.0		48	14	9.2		9.5		19	30	51.3		9.5			43	26.8		9.2		28	12	57.4		9.4			48	37.3	R
9.3			32	42.0		9.4			32	24.8		9.5		50	37	10.2	B	6.8			39	41.0	A	9.0			48	35.8	R
9.0		49	9	56.5	B	9.2			44	42.0		8.4			53	3.5	A	9.5		29	6	33.2		7.8		55	3	21.1	G
9.0			10	41.5		8.8		20	24	32.2	R	9.5		51	12	30.4		7.9			14	13.0	R	9.0			45	2.9	A
9.0			12	33.8		9.5			54	28.2		8.3			33	33.2	A	7.6			19	3.5	R	9.1		56	15	37.6	
9.5			39	51.0		9.5		22	0	54.3		9.2		52	11	12.2		9.5		30	1	12.8		6.0		57	13	21.2	G
9.3			52	57.3		9.0			16	47.9		9.4			29	41.5		9.5			6	15.0		9.5			13	58.8	
9.2		50	38	2.9		9.5		23	49	10.1		9.5			35	15.0		8.7			41	50.2		9.5		59	11	22.3	
7.5		51	58	0.6	R	9.2			50	30.3		8.0		53	7	18.9	A	8.3			48	5.3	R	8.4			35	28.0	A
9.4		52	5	58.0		9.4		24	12	39.6		9.5			58	29.8		9.4		31	22	7.2		9.0			54	44.3	A
9.5			36	50.0		9.0			26	3.2	A	9.3		54	26	12.9													

Zone +67°

1—40				41—80				81—120				121—160				161—200			
	0ᵘ		+67°		0ᵘ		+67°		0ᵘ—1ᵘ		+67°		1ᵘ		+67°		1ᵘ—2ᵘ		+67°
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	m	ᵘ	′ ″	′	m	ᵘ	′ ″	′	m	ᵘ	′ ″	′	
9.1	0	0 17	53.5		8.5	0	20 52	27.6	A	6.7	0	47 37	59.5	A	9.2	1	15 2	10.7		9.4	1	38 12	43.9	
9.5		42	28.6		9.5		21 5	23.2		9.5		48 14	3.1		9.5		23	44.5		9.2		48	10.8	
9.5		2 32	12.9		9.5		22 3	18.0		9.5		49 38	28.6		5.2		47	22.4	A	9.3		40 36	41.7	
8.8		4 8	40.3		9.5		6	20.6		9.4		54	48.6		9.2		50	22.3		8.0		37	38.3	A
8.4		22	37.4	A	8.9		25	37.3	A	9.4		50 41	15.0		9.0		58	54.8		8.5		42 4	28.0	A
7.8		5 24	21.9	B	9.4		26	16.8		9.5		43	26.7		9.5		16 6	43.9		9.4		29	33.1	
8.3		49	15.2	B	9.5		35	10.4		9.5		44	37.9		9.3		22	11.2	A	9.1		55	1.7	
9.2		59	49.9		9.4		23 29	58.1		9.2		51 34	56.9		9.0		17 35	50.3		7.4		43 32	26.0	A
9.4		59	41.4		9.5		30	1.2		8.0		52 39	53.9	B	9.5		18 58	25.0		5.2		44 49	58.0	A
9.5		6 55	11.3		8.2		33	11.8	L	9.4		59	0.5		9.4		20 12	25.0		9.0		55	39.3	A
9.1		55	17.8		9.5		33	36.9	B	9.5		53 55	24.1		9.0		38	8.2		9.5		45 7	12.7	
9.5		8 31	49.1		9.5		35	22.7		9.3		54 24	59.0		9.4		41	25.3		9.5		45	2.0	
9.5		35	14.3		9.1		24 25	21.2		9.2		24	47.6		7.4		21 57	39.2	G	8.5		47 0	49.6	A
8.8		10 2	32.5	R	8.5		25 52	41.2	B	9.5		55 34	38.1		8.2		22 9	12.8	J	9.2		11	34.5	
8.5		2	52.9	A	9.4		26 47	27.6		9.0		57 2	46.1	A	8.1		23 43	56.0	A	9.5		15	52.7	
9.5		3	13.8		6.8		27 8	7.6	B	9.1		7	50.2	A	9.3		45	30.1		9.2		48 22	31.1	
9.2		48	58.3		8.5		28 13	53.2		9.5		59 48	52.7		8.5		55	42.7	A	9.5		49 44	53.7	
8.1		54	41.8	A	9.5		34	0.0		6.8	1	1 7	0.3	B	9.3		24 7	8.9		9.5		51 11	29.4	
9.3		59	1.8		9.4		29 22	57.7		9.3		35	23.7		9.5		34	27.0		9.3		52 13	23.2	
8.0		11 2	38.3	A	9.5		30 15	40.0		9.5		3 5	51.1		8.8		25 54	12.1	A	9.0		53 24	30.1	A
9.3		21	55.8	B	9.5		31 46	58.2		9.5		4 3	4.6		8.7		26 0	10.1	A	8.4		54	54.5	A
9.2		51	3.2		8.0		34 1	22.1	L	9.2		44	36.7	B	9.5		34	0.2		9.5		59	7.6	
9.5		12 15	42.8		9.5		35 42	9.5		9.4		47	42.9		9.0		37	59.0		9.3		56 23	11.5	
9.5		49	10.4		9.2		44	21.1		9.0		6 43	54.8		9.4		51	45.1		9.5		46	48.9	
9.4		13 25	48.7		9.5		36 31	13.9		9.5		57	42.9		8.8		28 29	4.2	A	9.0		57 52	35.0	A
9.0		39	7.9		8.0		37 1	4.3	B	8.9		7 21	23.7		9.4		42	22.3		9.5		59 58	33.2	
6.5		41	0.6	F	9.3		12	4.1	B	9.5		8 13	20.6		9.5		30 8	1.1		9.5	2	0 3	8.9	
9.5		14 10	9.8		9.2		38 1	31.8		6.8		28	3.1	A	9.3		31 33	26.1		9.4		40	19.3	
9.5		29	28.6		9.0		10	45.4	A	9.5		56	10.2		6.1		41	18.3	A	8.0		2 48	26.1	A
9.1		43	4.6	A	9.5		39 40	55.0		8.9		9 17	2.2	A	9.4		32 29	58.8		9.0		3 37	13.3	
9.0		16 0	22.7	A	8.0		40 17	40.5	A	9.4		10 20	53.1		9.3		47	38.0	A	7.8		55	0.2	B
8.5		13	8.8	A	9.5		41 23	0.8		9.4		39	33.0	B	9.5		55	1.2		8.8		5 52	9.3	A
9.1		58	37.6	A	9.4		46	57.0		9.4		45	5.6		9.5		34 48	54.1		9.5		6 47	15.8	
9.0		17 1	59.5		9.4		43 50	58.1		9.3		11 10	1.1		9.5		49	46.0		8.9		8 24	41.4	
9.5		28	58.0		8.8		44 28	48.1		8.0		24	18.1	A	8.8		36 25	51.7	A	9.1		9 30	24.7	
9.0		52	3.3	A	9.5		45 36	44.3		8.2		12 33	48.3	A	9.4		30	23.1		8.8		49	53.7	
9.5		18 50	20.7		9.0		41	7.3	A	9.5		13 26	45.8		8.4		44	0.7	A	9.2		10 20	2.1	
9.5		19 37	2.7		9.5		46 33	57.4		8.7		35	21.1	A	9.5		37 18	32.3		9.2		21	20.0	A
9.5		49	34.7		9.2		47 13	38.9		9.4		14 7	34.2		9.5		40	13.8		9.0		34	44.9	
9.0		20 39	37.7	B	9.3		33	41.1	B	9.4		8	47.4		9.5		52	38.7		8.8		34	4.7	A

201—260					261—320					321—380					381—440					441—500				
	2ᵘ—3ᵘ		+67°			3ᵘ—4ᵘ		+67°			4ᵘ—5ᵘ		+67°			5ᵘ—6ᵘ		+67°			6ᵘ—7ᵘ		+67°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
9.5	2	10 59	23.7		9.5	3	8 53	5.6		7.8	4	7 36	23.4	A	8.5	5	9 44	30.6	A	7.9	6	25 4	26.2	A
8.9		13 19	54.7	A	9.3		11 8	47.6	A	9.1		46	43.6		9.4		51	14.4		9.1		59	11.1	A
9.4		14 49	3.3		9.4		12 33	27.1		9.0		59	11.6		9.3		12 15	11.9	A	9.1		28 0	30.1	A
9.3		51	53.6	B	9.2		55	27.6	B	8.5		9 49	21.9	L	8.3		13 0	30.6	A	9.5		29 13	28.5	A
9.1		15 26	48.2	B	9.5		14 5	20.6		8.4		49	34.2	A	8.0		39	46.8	B	9.5		30 36	12.4	
9.3		32	31.1		9.5		52	7.0		9.5		10 13	37.8	B	8.0		15 3	4.9	A	9.0		59	21.9	A
9.2		17 52	34.4	B	9.5		15 24	26.5		8.1		11 54	41.6	A	9.5		38	32.1		8.4		32 26	1.2	A
9.0		18 36	55.6		9.5		53	11.2		9.0		12 42	42.1	A	9.4		16 42	14.3		9.3		37	2.5	B
9.0		19 31	46.3		9.5		55	35.8		8.0		13 36	21.4	A	9.3		17 21	19.3	B	9.4		38	4.6	A
8.8		21 18	12.6	A	8.4		16 33	56.4	A	9.5		52	32.3		7.0		45	53.4	A	9.3		33 21	13.2	A
9.2		48	7.7		9.0		17 28	4.2		9.2		14 13	9.7		9.4		18 56	32.0		9.4		34 3	8.4	A
7.8		22 31	5.5	A	9.1		42	49.0		9.3		26	44.5		9.5		23 1	48.8		8.2		51	40.2	A
9.2		48	6.4		7.5		18 33	4.2	A	9.5		16 29	52.4		9.2		24 7	8.4	A	9.1		35 15	10.0	A
9.1		23 8	28.1		9.3		33	5.4	B	7.3		18 33	18.7	A	9.5		27 20	16.4		5.2		48	43.7	A
7.5		27	43.4	A	9.1		19 7	52.9	B	9.0		19 0	53.2		9.3		28 4	31.6		9.3		57	29.1	B
9.5		56	18.8		9.4		41	52.1		9.5		20 48	4.7		8.5		29 33	52.6	L	9.3		36 46	21.4	A
7.7		26 5	26.1	A	7.8		22 45	27.5	A	9.4		21 27	10.3		8.5		36	12.8	B	9.1		48	36.3	A
9.5		44	43.3		9.3		23 26	40.2		9.0		22 14	2.5	A	9.0		31 42	40.9	A	8.0		38 17	22.0	A
8.6		27 12	3.1		8.0		24 18	30.9	A	7.5		32	58.8	A	9.5		32 50	31.6		9.5		26	36.8	
9.5		28 16	58.5		9.4		25 31	57.1		8.9		48	51.4	A	9.5		34 50	27.7		9.5		39 21	0.4	A
8.0		29 21	50.6	L	9.5		58	48.5	A	9.5		26 24	23.8		9.1		36 24	57.1		9.0		40 28	24.0	A
7.8		58	26.5	G	9.0		26 21	47.6	A	9.3		27 12	8.7		9.2		38 46	18.8	A	9.5		41 11	40.7	
9.1		32 24	46.3		9.3		27 20	3.2		8.0		28 46	51.4	A	9.4		39 18	31.7		9.5		25	52.4	
6.6		26	12.4	G	9.5		38	46.2		8.7		30 30	29.7	L	9.5		40 7	6.0		9.5		42 53	23.0	
9.4		31	48.3		9.4		28 2	36.8		8.5		42	38.1	L	8.3		17	30.7	A	9.5		43 19	51.0	
8.9		33 34	10.7	F	9.5		22	44.1		9.5		31 48	1.6		9.4		41 25	19.8	A	7.0		45 21	30.4	L
9.3		34 21	7.3		9.4		34	46.1	B	7.5		33 28	28.9	A	8.3		47 27	18.0	B	9.3		34	20.2	
9.4		38 9	49.7	B	9.5		41	46.4		9.5		35 15	31.1		9.2		49 43	16.4	A	9.3		46 43	25.4	
9.5		55	8.5		9.1		30 43	54.2		9.5		37	19.8		9.4		50 35	17.8	A	9.5		48 15	59.8	
8.5		58	12.8		9.3		32 34	45.9		7.0		36 15	54.4	A	8.7		48	38.5	A	8.0		44	38.7	A
9.0		39 2	3.2		8.9		33 10	22.9		8.8		37 55	58.5	L	9.3		51 26	0.9	A	9.5		49 27	10.2	
9.1		6	26.5		9.3		24	54.9	B	9.5		38 20	40.8		8.2		52 11	21.3	A	9.5		50 42	16.6	
9.1		42 42	12.7	A	9.2		35 52	15.8	B	7.0		46	57.6	G	9.0		55 20	19.3		9.0		51 2	33.3	A
7.7		44 6	35.8	A	9.3		37 28	7.3		8.0		39 6	14.7	L	9.3		42	59.0	S	9.5		52 18	11.2	
8.9		52	56.4		8.9		38 39	27.3	A	9.5		19	6.2	B	9.4		56 46	47.7		9.1		53 18	7.8	A
9.0		46 22	20.0		8.0		42	6.8	A	7.5		40 35	17.5	A	9.5		47	9.3		8.5		36	30.4	A
9.0		29	0.9		8.7		42 45	5.4		7.0		42 42	33.0	A	8.1		58 46	51.3	L	9.5		55 45	59.8	
9.3		50 41	2.8		9.3		58	7.4		9.4		56	58.5	B	9.5		59 18	49.2		9.5		56 41	53.9	
9.0		47	56.9		8.4		44 17	56.8	A	9.3		43 19	59.3	B	9.2	6	0 32	8.9	A	9.3		59 56	50.4	
9.0		56	18.2		7.5		34	36.2	A	8.3		44	11.3	A	9.0		3 21	46.3	A	8.8	7	0 8	52.9	A
9.3		51 42	56.9		9.5		46 1	22.5		9.5		48	18.8		9.5		4 20	56.5	B	7.8		1 45	20.0	A
9.0		50	58.4		9.5		49 3	54.9		9.5		44 50	19.8		8.5		36	56.5	B	9.3		3 34	13.7	A
9.1		54 3	10.3		9.2		26	5.8		9.5		50 30	23.2		9.4		38	57.0		8.5		6 12	54.9	L
8.7		51	0.6	B	9.5		51 49	24.0		8.8		53 50	36.0		9.5		5 29	11.8		9.5		7 6	1.8	
9.5		55 31	22.5		9.4		56	15.5		9.1		56 1	24.6		9.3		8 24	2.9		7.9		8 39	29.9	F
8.8		56 58	48.1	A	9.5		52 16	19.1		9.4		57 11	19.3		9.5		10 7	46.2		7.6		10 27	24.0	A
9.5		57 58	28.6		9.4		53 28	56.8		6.9		21	29.3	B	9.5		15	5.1		8.5		13 7	56.4	A
8.9		58 25	49.5	A	9.5		55 8	18.6		8.5		37	38.5	A	9.4		24	56.5		8.5		52	8.8	A
9.5		59 38	24.1		9.4		24	24.8		9.0		43	11.1	A	9.0		13 26	22.2	A	9.0		14 0	42.6	A
7.5	3	0 29	58.8	A	7.4		33	58.8	B	9.1		54	25.2		9.5		15 36	32.0		9.0		13	20.5	A
9.1		2 2	49.5		8.5		58 6	35.7		7.0		59 8	16.8	A	9.5		16 9	18.3	A	9.5		15 53	31.8	
9.3		3 2	26.4		9.0		27	56.8	A	8.5		29	29.6	A	9.0		36	26.2	A	8.2		16 34	7.0	A
9.5		13	50.5		9.5		59 31	24.4	B	7.5		50	11.3	A	8.8		17 31	0.5	A	8.0		18 26	13.7	F
8.9		6 31	46.9	B	9.4	4	2 12	27.9		9.2		50	46.4	B	9.0		19 58	10.0		9.5		54	27.5	
9.2		47	48.2		8.7		25	3.3	A	9.4		54	45.0		9.1		20 9	17.1		9.4		20 25	10.5	
7.5		7 25	55.9	A	9.5		50	58.3		8.4	5	1 30	4.9	A	9.0		16	10.5		9.0		46	43.6	A
8.0		33	14.2	L	9.2		3 8	8.8	A	8.9		2 27	56.0	B	9.5		18	5.7		9.0		58	44.6	A
9.5		8 11	50.5		9.0		57	12.1	A	9.3		4 26	59.5	A	9.5		39	51.3		9.5		23 41	20.5	
9.0		15	58.9	A	8.4		5 29	30.8	A	7.5		31	48.7	A	9.4		22 19	3.8		8.3		24 31	21	
8.9		16	3.6	B	9.4		49	3.8		8.4		7 46	24.1		8.6		23 31	10.5	A	8.8		26 41	2	

501—560						561—620						621—680						681—740						741—800					
	7ᵘ—8ᵘ			+67°			8ᵘ—9ᵘ			+67°			9ᵘ—10ᵘ			+67°			10ᵘ—12ᵘ			+67°			12ᵘ—13ᵘ			+67°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
8.0	7	27	8	53.4	F	9.5	8	37	13	19.9		8.0	9	41	6	55.5	A	9.4	10	56	51	18.5		9.3	12	12	14	9.0	
9.3			35	33.3		9.5			54	5.8		9.5			45	28.1		9.2		57	59	21.3	A	6.8		13	32	12.1	A
9.5			37	8.4		9.4			56	6.4	B	9.5		42	34	4.5		8.9		59	34	59.1	A	9.3			40	8.1	B
8.8		28	36	55.6	F	9.2		40	0	18.4	A	9.0		43	43	58.5	A	8.0	11	0	41	32.1	A	9.5		15	57	23.1	
9.5		31	12	30.9		9.5		42	39	27.2		8.3		46	14	27.1	A	8.0		2	7	31.4	A	9.5		22	32	7.9	
8.0			18	12.0	A	9.5		43	20	46.2		9.1		47	9	49.1		8.6		3	33	48.4	A	6.5			48	41.8	A
9.5		33	50	42.4		8.8		44	35	50.5		9.4			17	1.8		9.5			50	31.1		9.3			57	59.9	
9.2			54	3.1	A	9.4		45	27	37.0		9.3		49	27	26.6		9.1		5	26	47.9	A	9.3		23	40	51.5	
9.5		34	6	32.0		8.8			59	38.0		9.5		50	56	57.0		9.4			32	58.3		9.5		24	42	47.6	
9.2			52	8.3	A	9.4		49	0	7.5		8.4		52	6	40.4	B	9.3		9	33	53.7		9.0		25	6	24.2	B
9.5		37	56	1.8		9.4		52	54	3.0		8.5			37	8.5	A	6.8			52	28.3	A	8.6			20	31.1	B
9.0		42	56	50.1	A	8.9		53	42	17.0		6.8		53	51	58.9	A	6.2		11	59	53.2	A	9.5		26	17	49.7	
9.5		43	7	7.4		5.2		55	40	27.2	A	8.1			52	6.3	A	9.4		12	45	39.5		9.5		27	23	43.8	
9.5			26	56.5		9.1		56	40	43.8	A	7.8		55	56	0.8	A	8.6		13	25	4.0	A	9.5		28	53	45.3	
8.7		44	10	41.3	A	9.1		57	19	6.3	A	7.8		56	46	32.9	A	9.4		15	19	3.6		9.1		30	21	57.0	A
9.4			18	18.2	B	8.8			22	14.7	A	9.5		58	49	3.4		8.8			20	27.2	A	9.1		31	14	10.8	A
9.1		49	7	20.9		5.3			38	43.8	A	8.4	10	1	12	55.0	A	9.5			52	29.7		9.5		32	6	56.0	
9.5		50	16	20.9		9.4		58	54	13.3		9.0		3	6	38.4		7.5		17	21	33.1	A	9.1		33	1	46.2	A
9.2			51	14.5	A	9.0	9	0	23	52.9		8.9			33	7.1	A	8.3			58	41.4	A	9.5			4	28.5	
9.0		51	35	18.8	A	9.0		1	15	7.4	B	9.5		5	33	37.9		9.1		20	37	46.6	B	9.5			37	35.4	
9.5		53	9	9.5		7.8		2	38	43.8	A	9.2			45	29.3	B	7.2			50	43.6	A	9.1		35	19	39.3	
9.5		54	34	47.8		8.8		4	18	56.3	A	9.5			53	49.1		8.8		22	40	4.6	A	9.5			21	51.1	
9.5		55	15	6.8		9.2		6	4	49.7	B	9.5		6	20	53.5		8.3		23	50	51.2	A	9.5		36	53	38.8	
9.4			28	3.2		8.3		7	32	23.2	A	9.4			29	26.3		8.3			59	6.3	A	5.3		41	35	34.9	A
8.2		56	42	37.6	A	9.1		9	38	48.8	A	9.3		7	56	42.7	A	9.2		24	43	7.6	A	9.5		42	49	18.2	
9.5		58	1	31.7		8.7		10	33	36.6	A	9.3		8	16	53.5	A	9.3		25	46	17.5		9.4		45	55	15.8	A
9.5			49	2.6		9.3			33	2.8	A	9.5		9	3	34.4		8.4		26	23	6.0		8.5		46	48	23.6	A
9.1	8	0	9	34.6		8.8		12	5	48.7	A	9.5		10	20	49.7		8.8			47	59.6		9.4		47	41	5.3	
8.5			16	50.3	A	9.2		17	40	46.0	A	9.0			48	31.9	A	7.9		27	56	8.6	A	9.5		48	16	50.6	
9.5		2	7	57.6		9.4		18	5	48.0	B	9.4		14	39	1.2		9.4		28	19	10.6		9.1		51	1	37.5	
9.4			51	30.7		9.1			18	12.8		8.5			55	40.8	A	8.9		31	6	20.4		8.7		52	32	26.6	A
8.6		4	6	24.8		8.2			51	39.8	A	8.9		16	19	46.7		9.0		32	51	29.7		9.4		53	46	13.0	B
9.5		5	19	17.0		9.4		19	22	26.6		7.5		17	10	25.0	A	8.4		34	18	54.0	B	5.8		54	24	22.7	A
7.0		6	46	58.6	A	7.5			30	29.5	A	9.4			25	50.6		5.3			21	33.1	A	9.5	13	2	26	47.9	
8.5		7	11	18.4		8.5		20	31	20.2	A	9.5		18	36	27.5		9.2			40	58.7		9.5		4	30	15.8	B
9.2		8	18	58.6	A	8.8		21	55	24.1	A	9.0		19	5	18.7	A	9.5		35	7	54.5		9.3		5	46	17.5	
8.5			20	56.2	A	7.2		22	12	26.0	A	9.3		20	25	7.8		8.5			31	39.5	A	9.4		6	29	20.2	
7.0			55	0.2	F	9.5		23	19	5.8		7.2			56	3.1	A	8.8		36	19	13.4	A	9.5		8	16	44.9	
9.5		11	1	29.7		9.5		24	21	44.2	A	9.5		22	47	53.0		7.8			54	40.0	A	9.5		10	56	7.3	
9.1			5	51.7	A	9.4		27	9	39.3		9.0		24	24	29.0	A	9.5		38	28	19.0		7.8		14	5	57.6	A
9.3			16	55.1	B	9.3			14	30.5		9.4		25	21	7.8		8.5		40	8	31.6	A	9.4			41	9.9	
7.2		13	11	44.4	A	6.5			22	55.2	B	9.3		29	51	57.8		9.0		44	6	45.4		9.4		15	42	29.6	B
9.0		14	10	20.9	A	9.3			28	52.5	B	9.5		31	53	47.2		8.9		45	31	0.4		9.3		17	56	41.3	
8.7		15	9	24.8	A	9.0			44	23.6		9.2		33	56	32.0	A	9.4		49	31	30.2		9.2		18	27	58.1	B
6.0		16	2	46.4	A	9.4		28	17	56.6		9.3		35	20	7.5		8.0		50	10	53.2	A	9.4		23	6	58.0	
9.5			28	31.7		9.4			57	48.1		9.1		36	42	7.8	A	9.5			58	32.9		8.7		24	31	47.8	A
9.5		17	22	8.1		9.4		29	6	52.1	B	9.3		38	49	0.5		9.2		52	18	23.1	A	9.5		30	48	1.2	
9.5			56	15.5		8.0			53	24.1	A	9.5			58	58.9		8.8		53	36	21.6	A	9.0		31	53	46.4	A
7.8		19	23	46.9	A	9.5		30	19	4.6		9.5		39	27	40.3		9.5		54	50	11.3		9.5		32	1	59.9	
8.9		20	46	41.0	A	8.2		31	9	2.4	B	9.0		41	6	1.9	A	7.5		57	13	8.6	A	6.3			42	46.8	A
8.9			47	21.9	A	8.3			13	48.7	A	7.8			9	19.7	A	9.4			38	23.6		9.2		33	40	37.5	
9.3		23	14	47.3		9.4		33	16	38.9		9.3		42	16	2.8		9.1		58	17	57.5		7.0			44	20.7	F
9.5			42	1.6		9.0		34	11	32.4	A	8.6		44	0	36.4	A	9.4		59	51	47.6		9.0		34	20	56.4	A
9.5		25	4	24.1	B	9.1			25	21.1	A	9.5		46	31	7.2		9.5	12	1	53	0.1		9.5		36	34	29.6	
9.5		29	32	5.3		9.2			39	36.9		9.5		49	14	49.1		8.3		6	3	53.0	A	9.5		37	29	6.5	
9.3			49	3.3	B	9.3		37	42	3.3		8.2			51	4.2	A	9.0			4	17.7		9.4			34	23.9	B
9.4			54	15.8	B	8.0		38	11	13.8	A	7.0		52	4	13.5	S	9.5		9	26	19.2		8.6		38	39	12.3	A
9.1		33	38	1.4		8.5			33	29.5	A	9.0			57	11.8	B	8.5		10	37	39.8	A	9.1			39	25.8	B
8.4		34	47	59.1	A	8.6		39	51	58.5	A	9.0		55	19	8.0	A	8.3		11	18	59.9	A	9.3		40	48	19.9	B
6.0		35	37	13.4	A	9.1		40	56	31.0		9.5		56	5	36.1		9.5			22	37.3		9.1		42	11	31.5	

801—860					861—920					921—980					981—1040					1041—1100				
	13ᵘ—14ᵘ		+67°			14ᵘ—15ᵘ		+67°			15ᵘ—16ᵘ		+67°			16ᵘ—17ᵘ		+67°			17ᵘ—18ᵘ		+67°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
9.5	13	42 56	56.1		9.2	14	57 34	11.0		9.0	15	55 58	53.7	A	9.4	16	59 26	3.0	A	9.0	17	55 36	30.1	A
8.4		43 6	4.5	B	7.5		58 11	39.2	L	9.5	16	0 49	11.5	A	8.7		29 12.4		A	9.5		56 3	3.2	
9.1		45 55	11.9		9.3		24	57.9		9.3		1 23	31.7	A	9.5		29	29.7		8.7		57 18	36.9	A
8.9		46 12	38.4		8.7	15	0 46	46.5	A	9.5		2 32	1.2		8.5	17	3 13	22.7	A	8.8		59 19	47.8	A
8.9		44	50.7	A	9.5		1 33	4.6		9.3		4 32	11.0	A	9.3		53	42.4	A	9.0	18	0 45	4.4	B
9.4		47 55	39.5	B	9.5		3 24	21.0		9.0		42	21.8	A	9.5		5 19	28.7		9.5		3 38	12.0	
9.5		49 27	50.2		9.5		44	49.4		9.3		57	15.0		8.6		46	1.4	A	8.6		4 36	24.3	A
9.4		38	10.9		9.0		5 37	35.7		8.7		9 0	45.4	A	9.5		6 54	16.0		9.2		5 49	7.1	A
9.3		51 10	24.7		9.4		7 29	13.1	A	9.5		12	51.7		9.3		7 31	48.8		8.3		6 32	19.3	
9.5		15	7.7	B	9.0		8 2	18.1	A	6.3		11 54	30.9	A	9.1		46	27.7		9.0		7 12	50.2	A
9.2		52 18	52.6		9.0		15	15.5	A	9.4		12 14	37.1		9.5		52	40.5		7.5		8 8	22.0	A
8.0		35	39.4	A	9.5		10 36	36.9		9.5		13 58	57.0	A	8.8		9 7	42.3		7.5		9 34	58.5	A
8.8		53 39	42.7	A	8.2		45	30.9	B	8.7		59	36.6	B	8.7		10 18	0.4	A	8.5		10 17	27.2	A
9.3		54 53	29.4	B	9.0		11 51	8.4	A	9.5		14 14	2.4		9.2		12 51	54.1	A	8.0		30	44.9	A
9.5		55 12	33.5		8.1		12 6	23.9	A	8.6		16 29	35.2	B	8.4		58	47.3	A	8.9		11 3	9.9	A
9.4		22	24.9	B	5.2		13 0	53.8	B	9.4		40	27.5		8.5		14 14	37.1	A	9.5		7	3.5	
8.5		56 10	45.3	A	9.4		44	29.4		9.0		18 7	36.5	B	7.3		15 27	32.8	B	9.5		28	5.5	
8.0		34	27.4	B	9.5		50	45.0	B	9.5		19 45	10.8		9.5		17 12	46.9		9.5		30	36.4	
9.0		58 43	29.6		9.5		14 17	7.0		9.5		21 49	4.4	B	9.5		12	16.4		9.2		13 47	58.3	A
8.0		59 3	47.8	A	9.4		28	16.9	A	8.8		23 26	3.2		9.5		38	38.7		9.3		15 31	50.4	
9.0		52	56.5		9.1		15 32	51.2	A	7.3		24 56	22.5	L	9.2		39	5.9		9.5		58	47.9	
8.5	14	1 21	2.5	A	9.5		18 5	50.4	A	6.8		28 2	22.0	L	9.4		18 9	5.1		9.2		16 11	49.9	B
8.5		42	8.1	A	8.0		22	31.7	A	9.2		29 28	6.2		9.3		34	31.6		9.3		50	35.3	
9.4		3 22	28.6		9.5		19 14	6.4		9.5		47	31.4		8.0		19 34	26.7	L	9.5		17 18	30.1	
9.4		5 42	37.0		9.0		18	41.5	A	8.4		30 14	39.6	B	9.5		57	11.1		9.5		41	1.3	
9.2		7 10	6.6		9.5		20 3	54.7	A	9.4		52	0.9		9.5		20 33	13.0		7.0		19 59	20.3	A
9.2		42	19.7		8.7		22 37	3.9	B	9.4		31 1	51.5	A	9.3		21 32	59.6	A	9.1		21 17	50.2	A
9.1		9 25	42.7		9.4		23 12	40.0	A	9.4		16	34.2	B	9.5		22 24	59.1		9.5		21	10.4	
9.4		10 1	1.3		9.4		19	59.1		8.3		57	53.5	A	9.5		23 43	12.0		9.5		24 21	0.3	
9.5		13 37	31.5		9.0		24 4	33.6	A	8.0		32 19	3.2	L	8.8		58	40.0		9.5		25 21	26.9	B
8.0		16 28	45.7	A	9.1		31	30.7	A	8.9		50	50.6	A	9.2		24 27	41.4		9.0		27 18	16.3	
8.0		17 10	33.9	A	9.2		37	20.4		8.7		33 5	1.3	A	9.5		45	36.0		9.5		36	15.3	
9.0		14	26.6	A	9.5		25 38	40.5		9.1		34	55.3	A	9.1		25 2	56.7		9.5		37	20.8	
9.2		33	9.4		9.2		45	8.6	A	9.5		34 32	54.9	B	6.5		27	25.7	B	9.0		57	43.8	A
7.3		19 19	12.1	A	8.8		26 1	9.5	A	8.3		51	40.8	B	7.8		26 45	53.0	A	9.4		28 52	37.5	
9.3		44	12.9	B	9.5		45	58.1		9.2		35 32	33.4	A	9.5		58	49.9		9.3		31 0	43.3	B
9.5		22 46	32.6		8.7		27 54	8.9	A	9.5		36 10	8.1		8.1		30 15	3.0	A	9.2		26	39.3	A
8.3		23 2	1.5	A	9.5		28 1	27.3		8.5		37 32	21.6	A	9.2		31 52	3.5	A	9.5		26	13.4	
9.0		25 55	49.8	A	9.4		6	42.4	A	9.5		56	27.5		7.6		32 54	4.6	A	6.5		32 42	39.4	A
9.0		26 23	55.7	A	9.0		8	41.9	A	9.5		38 14	5.9		9.0		33 28	25.7	A	9.5		34 15	11.8	
8.8		29 15	5.1	A	7.9		29 37	9.7	B	8.8		39 52	53.5		8.0		33	18.4	A	9.4		35 48	41.8	
9.0		23	5.6	A	9.1		30 10	34.1	A	7.9		40 46	14.0	B	9.0		34 6	16.7	A	9.5		36 31	30.1	
7.3		31 49	26.2	A	8.6		31 34	31.6	A	9.3		41 44	2.9	A	9.0		30	47.8		8.9		36	47.8	
9.5		34 4	23.8		8.9		33 29	7.2	B	9.5		42 32	6.2		9.4		35	18.0	B	9.0		55	1.0	A
9.5		35 51	55.2		9.0		34 52	3.2	B	9.3		33	33.4		8.7		49	0.8	A	7.5		37 19	39.4	A
9.5		36 13	12.0		9.5		35 26	42.4		9.5		43 53	41.7		8.5		35 29	47.9	A	9.3		38 0	8.0	A
8.5		37 8	48.4	A	9.5		54	4.7		9.1		44 33	2.2	A	7.6		37 16	12.0	B	8.0		35	0.6	A
9.2		39 47	53.7		9.4		36 10	4.4		7.8		45 6	8.4	A	9.3		38 6	29.7	B	9.5		39 25	22.3	A
9.5		41 11	43.4		9.0		37 34	41.0		6.8		47 1	30.7	A	9.5		41 9	38.8		9.1		41 41	59.5	
9.1		42 47	32.6		9.5		38 0	17.0		8.5		10	11.3	A	9.4		38	37.8	B	9.5		42 17	26.7	
9.1		44 29	24.3		8.8		39 19	31.6	A	7.8		49 33	50.7	A	7.0		37	12.8	L	9.1		30	[illegible]	
8.5		45 46	12.2	B	8.3		52	46.9	A	8.8		56	29.7	A	9.0		42 39	32.7		9.3		54		
9.5		47 14	20.4		9.1		40 45	14.1	B	9.0		51 44	29.2	A	8.7		44 37	47.9	B	[illegible]		43 4[illegible]		
9.5		48 7	10.1	A	8.5		41 39	31.6	A	8.5		45	52.7	A	9.2		53	21.5	B					
9.3		49 26	3.1	A	8.2		42 48	57.3	B	9.5		52	6.7	B	8.6		45 17	27.2	B					
9.4		51 54	10.6		8.6		43 31	45.3	B	9.4		52 45	54.7		8.0		46 35	40.4	A					
9.5		53 34	23.9	A	8.7		53	13.5	A	6.5		55 52	42.4	G	9.2		48 42	18.3						
8.0		51	11.9	A	9.2		44 17	18.5	B	8.7		56 56	38.0	G	9.0		50 10	41.1						
9.4		55 43	50.9		9.5		52 20	59.1		8.8		58 9	59.1		9.1		52 57	1.2						
9.0		56 56	45.0		9.5		54 52	22.8		9.3		59 25	22.3		8.5		54 49	46.2						

1101—1160					1161—1220					1221—1280					1281—1340					1341—1400				
	18u—19u			+67°		19u—20u			+67°		20u			+67°		20u—21u			+67°		21u—22u			+67°
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
8.6	18	55	18	39.4	A	9.5	19	30	33	17.2		9.0	20	1	53	29.4	B	9.5	20	57	55	58.6		9.5	21	37	1	16.2	
9.1			37	11.3	A	8.0		31	28	22.9	A	5.1		2	10	27.3	A	9.2		59	4	53.1		9.5			5	40.7	
9.5			45	34.5	A	9.5		32	5	35.8		8.8			19	56.6	A	6.8			48	35.9	A	8.4			29	42.7	A
9.4		57	24	4.0		8.9		33	5	27.1	A	9.3			22	25.3		9.5	21	1	54	53.6		9.5			34	38.9	
9.3		58	5	3.5	B	9.4		34	8	24.6	B	9.5		3	5	59.0		8.8		3	5	24.6		9.0		38	20	10.8	
9.1		59	35	35.5		9.5			14	27.0		7.0		4	20	37.3	A	9.3		4	10	47.8		9.5			25	19.5	
9.5	19	0	10	47.9		8.5			32	28.8	A	8.5		5	48	53.3	A	9.5			20	11.9		9.5			26	27.1	
9.2			30	48.0		9.5			57	24.1	B	8.7		6	37	34.8		7.0		5	45	39.9	F	9.0			35	5.9	
9.4		2	14	58.1		9.5		35	0	53.7		8.2		7	6	38.7	F	9.3		6	11	10.8		9.5			40	22.0	B
9.5		3	31	19.3		9.4			5	6.2		9.4			46	2.5		9.5			42	55.9		9.5		39	4	31.5	
9.5		4	20	13.2		9.4			34	3.8		9.3			48	4.0	B	8.7		7	33	54.4	A	9.5			13	54.5	
9.5		5	17	38.0		9.3			55	34.9		9.5		9	16	4.5		9.4		8	31	56.9		9.0		40	22	36.8	
9.5		6	25	2.0		9.5		36	24	41.8		7.7			35	51.7	A	9.0			34	24.5		9.2			43	28.0	
8.8			41	0.1		9.5			26	2.8		9.1		10	5	43.4	R	9.2		9	25	49.5		9.5			47	58.3	
9.5			51	49.6		9.5		37	3	9.8		6.9			17	49.7	A	7.8		11	12	33.3	B	9.5		41	34	12.7	
8.8		7	12	56.8		9.5			21	56.5		9.5		13	11	8.2		9.4			50	54.9		8.5			39	43.2	
8.6			29	5.5		9.5		38	46	57.6		9.3			54	19.8	A	9.5		13	19	16.2		8.1		42	25	4.9	B
8.9			55	10.4		9.0			58	33.5		9.5		15	17	39.0		9.1			31	45.1	B	9.5			51	49.5	
9.2		8	4	41.7	B	9.5		40	28	29.2		9.5		16	46	31.6		7.5			34	44.9	B	8.9		43	44	32.0	
9.2			6	5.4		9.4			32	0.7		9.5		17	31	16.9		9.4		14	16	39.4		9.5		45	10	26.5	
9.2		9	5	37.1		9.4			50	52.7		8.8		20	9	21.0	A	9.2			19	49.9	B	9.3			25	14.7	
9.5			36	41.5		9.3			55	51.5		9.5			54	41.7		8.8			25	35.8		8.0			53	35.5	F
9.5			49	40.0	B	9.5		41	7	48.7		9.2		21	24	0.8		8.0		15	48	56.8	A	9.5		46	11	39.8	
9.5			54	2.4		9.5			14	29.8		9.5		22	52	9.4		9.0		16	13	26.0		9.5			13	36.9	
9.5		10	30	34.5		9.0			25	43.5		8.6		23	32	54.0	A	9.5			31	31.4		9.0			17	28.0	A
9.5			32	37.8		9.5			26	17.2		9.5			47	33.5		9.5		18	35	11.2		9.5			36	22.5	
8.9			50	16.6	B	8.5			27	12.0	F	9.2		24	18	1.2	A	9.4		19	40	20.5		9.5			54	39.7	
8.6		12	17	44.1	A	9.5		42	8	59.1		8.5			30	48.3	A	9.3			55	31.4		9.0		49	2	46.7	
3.4			31	24.3	A	9.5			18	59.4		9.0			58	13.3	A	8.9			58	59.8	B	8.5			24	6.8	A
9.1			40	20.2	B	9.3		43	46	6.0		9.5		25	1	15.8		9.0		21	1	53.7	B	9.2			47	25.2	A
9.3		13	30	58.4		9.1		44	18	16.6		8.8			39	5.5	A	9.4		22	0	36.8		7.0		50	0	48.1	F
8.8		14	23	38.7	A	9.4			23	12.1		8.3		26	48	24.1	A	9.2			14	40.2		6.9			2	25.5	A
9.0			24	38.4		9.2			27	35.4		9.5		28	30	14.3		9.0		23	26	6.3		9.2			13	18.7	
9.5		16	23	24.9		8.7			31	41.0		9.5		31	5	44.8		9.2		24	1	54.4		8.1			51	17.2	A
9.0			47	25.5	S	9.4			37	49.4		9.0			12	27.1		9.5			38	34.3		6.8		51	25	4.8	
8.8			56	38.2		9.5		45	8	2.5		9.5		32	38	49.2		9.3		25	7	1.4		9.5			32	22.0	
9.2		17	5	51.8		9.5			8	3.2		9.4		33	38	4.1		9.3			41	44.6		8.5			58	2.5	A
9.2			28	39.5		9.4			16	14.2		9.5		35	7	29.0		9.1			42	11.2		9.2		52	39	55.0	
9.4		18	11	28.8		9.3			32	54.0		9.5			41	48.7		9.5			48	37.3		9.3			40	46.7	
9.5			20	1.0		7.4			33	7.0	B	9.1		36	13	17.8		8.6			54	16.2		8.5		53	41	18.4	B
9.5			31	41.1		7.6			36	22.6	L	8.9		38	29	17.8	F	8.7		26	39	57.6		9.5		54	10	24.2	
8.9			32	22.6		9.4		47	14	28.6		9.2			31	2.9		7.3		28	5	39.3	G	7.5		56	21	16.2	A
9.5		19	42	27.6		9.5			29	10.8	B	9.4		41	3	5.7		9.5			35	43.7		9.5			53	17.2	
9.0		20	11	54.8		9.3			37	25.2	B	9.5		42	40	50.1		8.5		29	10	44.2	G	8.4		58	19	28.3	A
9.5			23	7.9		9.4			52	38.4		9.3		45	5	28.6		9.4			33	47.7		9.5			59	23.1	
9.5		22	8	49.3		8.4		50	29	12.3	B	9.0		46	2	14.3		9.2		30	20	20.6		8.8		59	2	33.5	A
9.3		23	46	40.9		8.0			50	51.7	A	6.5			51	29.4	F	9.5		32	42	9.9		9.2			5	25.5	
9.3			49	46.7		9.5		52	17	26.7		9.5			56	26.9		9.3			45	18.7		9.5			41	17.6	
9.3		24	10	41.1	B	9.5			45	21.7		9.5			59	5.3		6.8			48	34.2	A	9.5			42	11.4	
9.3			22	14.5		8.5			58	7.4	F	9.5		48	5	55.8		9.5		33	23	55.0		9.5	22	0	17	25.3	
9.5		25	44	28.4		7.7		54	0	7.2	A	9.0		50	26	46.7		9.5			40	6.1	B	8.8			48	48.0	
9.5		26	13	29.9		9.5			40	29.7		9.5		51	15	39.9		8.3		34	12	32.0	A	9.5			54	23.4	
9.5		27	58	21.0		8.7		56	48	14.8	L	8.9		52	20	8.2	A	8.9			37	26.0	A	8.4		1	14	40.4	A
9.4		28	12	1.5		8.9		57	21	29.2		9.3			57	25.2	B	9.5			48	23.4		9.2			37	3.0	
9.5			25	4.8		9.5			43	39.5		9.5		53	49	50.1		9.5		35	12	47.2		9.2			48	5.3	B
7.5			35	19.7	A	7.4		58	17	3.9	A	9.3		54	30	21.7		9.5		36	26	47.6		8.7		2	57	55.8	
8.0			52	52.6	A	8.8			39	5.2	A	9.4			46	39.8		9.4			29	58.4		9.5		3	2	2.3	
9.5			57	51.0		9.1			39	6.4	A	9.4		55	26	29.1		8.9			39	11.7	B	9.5			3	33.0	
8.7		29	7	1.1		9.5		59	10	40.8		7.2			59	11.7	A	8.5			55	56.9	A	9.5			3	11.0	
9.5			10	9.3		9.1	20	1	26	56.3		9.5		56	33	31.0		8.5			58	28.0	A	9.5			14	45.9	

1401—1440					1441—1480					1481—1520					1521—1560					1561—1601				
	22ᵘ		+67°			22ᵘ		+67°			22ᵘ—23ᵘ		+67°			23ᵘ		+67°			23ᵘ		+67°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.5	22	3 17	46.8	B	8.7	22	24 22	9.6	B	8.0	22	50 37	50.7	F	9.5	23	16 16	0.7		8.6	23	39 33	50.2	A
7.5		35	35.6	F	9.0		25 30	25.0	A	7.5		47	28.5	B	8.5		39	43.4	A	5.5		41 3	0.0	A
9.5		4 21	0.7		7.8		30	28.5	A	9.5		51 20	18.5		9.4		18 47	15.1		9.5		35	1.6	
9.4		28	29.0		9.2		44	28.0		9.2		32	54.8		9.1		19 32	16.6		8.4		42 12	51.2	A
7.9		32	48.8	F	9.4		26 34	16.6		7.8		52 38	37.6	A	8.0		20 38	4.3	A	9.5		59	45.8	
9.5		34	41.7		9.5		27 20	42.6		9.5		59	49.9		9.5		22 4	54.3		9.5		43 15	45.3	
9.5		58	45.2		9.1		28 11	49.5		9.5		53 9	17.0		9.4		26	51.3		8.5		44 26	15.3	A
9.0		5 5	28.2	B	9.0		15	20.4	B	9.5		11	20.9		7.8		23 57	26.8	A	9.5		45 23	51.6	
8.0		15	0.4	F	9.4		21	4.8		8.8		12	0.7	R	9.5		24 26	42.5		8.9		26	31.5	A
9.0		33	0.7		7.3		49	45.1	A	8.5		54 40	11.5	A	9.4		25 1	5.3		8.2		36	14.3	A
9.2		6 21	31.2		9.0		29 56	45.9	A	8.7		49	27.4	B	9.2		48	27.8	A	9.0		36	30.0	A
9.2		23	3.3		8.8		31 8	19.0	A	9.5		55 3	49.0		9.5		27 14	25.3		9.1		53	58.5	A
9.5		48	44.3		9.5		39	0.0		7.9		56 16	0.0	R	9.0		15	41.5		9.5		46 5	42.4	
9.1		50	55.8		8.5		32 47	19.4	A	9.3		20	39.5	B	8.5		23	12.9	A	9.2		7	52.2	
9.5		7 25	38.0		9.5		33 21	0.4		8.2		24	39.7	B	9.5		27	10.7		9.5		47 41	22.7	
9.5		46	36.3		9.5		34 44	10.1		9.5		57 22	12.9		9.3		55	41.5		9.5		48 40	5.9	
9.4		8 41	35.6		8.1		35 41	45.0	A	9.5		58 58	8.6		9.4		55	46.0		9.5		46	12.7	
9.5		9 2	46.0		9.5		44	39.5		7.5	23	59 25	37.7	B	9.3		28 34	42.0		9.5		49 6	9.4	
9.3		2	25.7		9.5		36 6	1.2		8.8		1 16	4.6	R	9.3		49	16.3	B	9.5		57	27.6	
8.9		16	55.0	A	9.5		37 20	40.5		8.9		50	7.7	R	8.5		59	0.4	A	9.5		50 21	2.0	
9.2		57	55.8		9.5		56	18.0		9.3		2 59	22.3		9.5		29 4	1.7		9.5		37	40.2	
9.3		11 59	55.2	A	9.5		38 21	44.0		9.5		3 46	32.6		7.2		59	2.8	A	9.5		37	46.3	
9.2		12 25	30.1		8.5		40 15	22.8	A	7.9		55	39.0	A	9.5		30 1	24.5		8.3		52 7	33.5	
9.2		29	36.9	A	8.8		24	15.5	R	7.9		4 26	51.2	A	9.5		40	58.0		9.5		13	12.9	
9.5		14 2	30.1		9.5		41 8	36.6		9.3		42	16.0		9.3		52	57.6		9.4		40	2.9	B
7.3		15 8	42.5	A	9.5		43 46	56.7		9.1		5 24	29.8		9.0		31 12	25.1		7.9		53 6	2.7	B
9.5		44	25.1		9.5		58	8.0		9.3		54	51.3		8.0		12	8.1	A	8.8		13	26.1	
9.4		16 4	41.0	A	6.5		44 7	49.3	A	8.4		6 59	51.7	A	9.1		52	39.9	A	7.9		38	39.0	B
9.5		11	23.2		8.6		45 27	36.6	B	9.5		8 1	18.5		8.3		32 13	39.3	A	8.0		50	41.5	B
9.5		41	52.4		8.9		31	41.2	B	9.5		53	54.2		8.8		23	55.6		9.5		57	33.5	
9.5		42	44.3		7.7		47 24	12.5	A	8.7		9 18	1.0	F	9.4		33 8	15.3		9.5		54 8	22.7	
9.0		17 27	18.4		9.1		26	56.8	B	9.5		11 48	38.8		9.5		49	22.6		9.0		16	40.4	
9.5		18 8	17.2		9.3		30	45.5		9.5		51	49.0		9.1		34 6	36.5	A	9.1		55 53	42.8	A
9.5		19 27	55.9		9.3		30	46.3		5.2		12 43	19.4	A	9.0		20	25.4		9.5		56 1	29.6	
9.5		34	34.8		7.3		35	12.5	A	9.2		13 53	4.0		7.7		33	33.2	A	9.5		3	50.7	
9.5		20 16	53.9		9.5		48 29	39.1		9.5		14 29	3.7		9.5		52	20.2		9.0		13	20.7	A
8.8		21 14	11.2		9.5		49 15	47.6		9.3		54	57.3		8.0		35 14	52.1	F	8.8		18	35.0	A
9.4		55	46.9		9.5		24	45.1		9.5		16 5	8.6		9.0		59	55.6		8.8		57 23	22.2	A
9.0		22 31	42.9	B	8.5		33	2.6		9.4		5	14.5		9.2		36 51	31.0		7.7		40	2.0	B
9.5		23 6	31.3		9.5		42	48.2		9.3		12	45.0		9.5		37 2	57.5		7.8		58 48	49.1	G
																				9.0		59 43	42.4	

Zone +68°

1—40					41—80					81—120					121—160					161—200				
	0h		+68°			0h—1h		+68°			1h		+68°			1h—2h		+68°			2h		+68°	
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	
9.2	0	0	44	14.7	9.5	0	31	24	51.1	9.0	1	2	2	36.2	A	9.0	1	29	33	3.3		9.5	2	7	59	3.1	
9.5		2	8	17.6	9.4		33	9	0.1	9.3		3	57	44.9		8.0		31	18	20.0	A	9.1		9	59	49.7	
9.0		3	26	57.8	9.5			11	3.5	8.6		5	12	50.8	B	9.0		32	7	42.9	A	9.0		10	18	17.6	
9.5			59	50.8	9.5		35	32	15.4	9.4		6	15	28.6		9.5		33	10	10.0		8.7			22	35.0	
9.5		4	57	7.4	9.5		36	19	34.8	9.4			20	32.6		7.3		34	4	45.7	A	9.0			49	23.2	
8.7		5	12	47.5	A	9.3			34	15.1	8.9		7	25	18.2		9.4		35	47	26.3		7.5			51	6.5	L
9.4		6	58	46.2	B	9.2			41	23.8	A	9.1			48	53.8		9.5		36	2	36.0		9.3		14	17	11.9	
9.5		8	6	56.3		9.5		37	18	22.8		9.5			56	27.1		9.5		38	18	21.1		8.5		16	8	0.0	A
9.5			52	42.0		6.4			36	31.8	A	8.9		8	0	52.8	B	9.5			34	11.2		9.5			24	41.4	
9.5		9	38	7.8	B	9.4			50	27.0	A	8.4		9	43	10.0		9.3			37	24.8		9.3		17	50	7.4	
9.5		10	1	6.8		9.1			59	6.6		9.0		10	2	20.3		9.5		39	45	26.0		8.7		19	3	59.5	L
9.1			35	37.7		9.0		38	0	13.4		9.1			49	7.7		9.5		40	15	10.3		9.4		21	47	4.7	
9.5		12	7	52.8		9.5			38	5.6		8.4		11	0	15.3	A	9.3			23	53.0		8.4			55	35.0	
7.5			22	2.9	A	8.8		39	10	45.3	L	8.3			34	28.3	A	8.0		43	8	27.6	A	8.2		22	35	19.9	L
9.1			48	38.4		9.5			34	4.9		9.5		12	3	0.6		9.5		44	20	36.4		9.3		23	51	48.8	
9.5		15	48	57.8		8.2		42	31	10.9	L	9.3		13	0	58.6		9.5		46	4	18.3		7.5		25	3	25.8	A
9.5		16	18	33.1		7.4		43	38	4.8	A	9.2			13	56.1		9.0			51	43.8		8.0		26	12	40.3	A
9.5			35	18.1		9.0		45	8	15.8		9.3			33	40.4		9.2		47	16	19.0		9.5		27	17	52.9	
9.5		17	26	7.9		9.3			48	32.3		9.5			51	29.5		9.4			44	22.2		8.8			27	25.4	A
9.4		18	20	50.8		9.1		47	29	15.9	A	9.3		14	20	5.5		9.0			46	56.5	L	9.5			40	51.0	
9.5			30	18.5		9.0		49	51	33.5		9.0			20	13.3		9.0		50	18	4.0		9.1		28	33	25.4	A
8.7			30	56.9	L	9.3		50	17	25.3		9.5		15	45	22.2		9.4		51	17	29.0		9.5			46	33.5	
9.5		19	33	20.1		8.5			48	33.8	L	9.4			52	14.8		9.4			38	41.1		9.1		29	6	49.7	
8.7			39	7.2		7.0		52	1	34.5	B	9.3		16	17	30.7		8.0			54	52.6	A	8.8		30	51	57.0	
9.4		21	22	8.5		9.2			10	33.2		9.4			54	31.2		8.1		52	15	14.6	B	9.0			54	1.5	
8.4			30	17.2	A	9.0			17	8.6	B	9.5		17	39	43.2		9.4			30	15.4		9.2		31	10	56.0	A
9.3			33	12.5	B	8.1		53	20	27.1	B	9.2		19	24	23.6		9.5		53	4	3.3		9.5			24	34.5	
9.1			48	18.7		9.0		54	21	45.8	A	9.5			31	23.7		9.4			17	5.1		8.7			40	58.0	A
7.2		22	39	59.2	B	9.5		55	30	51.1		9.5		21	18	30.2		9.5			31	50.7		8.5			52	1.5	L
9.4			52	2.6		8.5			44	12.4	A	9.1			45	48.2		9.5		58	57	5.3		8.7		33	1	0.1	
9.1		23	27	31.2	A	9.0		56	49	19.8	A	9.0		22	24	11.3	A	8.9	2	0	4	48.2	A	8.9			19	41.7	
8.7			38	9.5	B	8.6		57	19	3.4	A	9.3			26	25.9		9.2		1	6	41.7		9.4			43	9.2	
8.5			45	31.5	A	8.9		58	27	49.8		6.8		24	10	11.8	B	7.6			28	40.9	B	9.2		35	58	15.2	B
8.5		26	2	37.8	L	7.9		59	26	55.3	A	9.5		25	13	45.7		9.5			49	12.4		9.4		36	28	13.4	
9.0			46	56.6	A	9.0			53	50.5	B	9.5		26	4	15.9		9.4		2	47	28.1		9.4			41	11.2	
9.5			54	11.5		9.4	1	0	5	51.8		9.4			35	49.1		9.5			53	55.1		9.4			51	3.8	
8.3		27	44	54.0	A	6.0			56	0.2	A	8.5		27	19	42.2	A	9.4		3	18	35.0		9.3		37	38	51.5	A
8.0			57	28.9	L	9.5		1	1	31.0		9.5			31	26.0		9.3		4	17	32.3		9.5			54	53.4	
9.5		28	25	40.9		9.5			21	12.9		9.1		29	13	19.0		9.5		7	18	49.8		8.5		38	22	13.6	A
9.5		30	57	25.7		9.5		2	0	0.0		9.5			28	48.7		9.5			52	11.9		6.5		39	7	16.6	A

201—260					261—320					321—380					381—440					441—500				
	2ᵃ—3ᵃ		+68°			3ᵃ—4ᵃ		+68°			4ᵃ—5ᵃ		+68°			5ᵃ—6ᵃ		+68°			6ᵃ—7ᵃ		+68°	
m	ᵃ ′	″	′		m	ᵃ ′	″	′		m	ᵃ ′	″	′		m	ᵃ ′	″	′		m	ᵃ ′	″	′	
9.0	2 40	28	9.1	A	9.3	3 24	6	34.9		9.2	4 9	39	51.5		9.5	5 6	13	18.7		9.3	6 13	4	16.3	A
9.0		45	29.8	A	9.4		7	7.8		9.1	10	11	11.1		9.5	7	15	47.5		8.7	20	26	42.8	A
9.5		57	12.2		9.4		17	47.8	B	9.5	12	27	11.1		8.9	8	4	30.8	A	9.4	21	34	44.3	A
9.5	41	29	16.1		9.1		17	19.2		9.5		27	24.2		9.0		5	38.7	A	9.3		45	1.0	
9.4		39	3.3		9.4		39	51.7		9.2		42	1.7		9.5	10	40	41.4		9.3	22	40	24.4	A
8.5	43	0	23.5		9.3	26	14	35.2		9.5	13	13	15.5		9.3	11	35	36.1	A	9.0		55	51.3	A
9.5		45	31.8		9.5		48	42.0		9.1		58	56.1	B	8.8		38	4.4		8.0	25	52	45.9	B
8.6		50	14.5	A	9.5		51	8.2		9.5	15	11	49.4		9.5	12	2	37.7		9.5	26	12	8.3	
7.8	45	1	36.4	A	9.1	28	32	12.0		8.8		40	55.4	B	9.5	13	57	55.3		9.5	29	17	28.8	
9.5		13	36.8	A	9.4		59	33.3		9.4	16	3	56.9		9.2	16	23	28.5		9.5	31	27	23.2	
9.1	46	31	35.8	A	9.4	30	7	48.1		9.3	18	22	10.7		9.4		26	8.9		9.4		37	14.5	B
7.9		58	53.9	A	9.2		28	23.7		9.3		24	25.0		9.3	17	32	15.7		9.1	33	5	38.9	
9.0	47	34	4.8		8.3		41	21.4	A	9.5		49	41.1		8.3	20	41	59.4	B	8.4	35	43	22.8	L
8.4	49	20	38.4	A	9.5	31	13	7.6		8.4	19	2	51.5	A	9.4	21	49	38.2		8.2	39	17	24.8	A
9.4	51	35	29.8		9.4		17	5.6		9.5	20	58	27.3		9.2		55	7.0	A	9.5		32	50.0	
9.4	52	5	26.2		9.5	32	28	24.1		8.4	22	50	14.7	A	9.4		56	59.7		8.5	41	37	22.5	A
9.2		5	23.0		9.5		56	8.5		9.5	23	0	27.6		9.5	25	17	2.0		8.2	42	41	32.0	A
9.5	55	39	11.7		9.0	33	49	12.0		9.5		38	54.4		9.3		22	42.5		8.0	43	31	55.9	A
9.4		59	15.5		9.3	34	22	45.3	B	8.5	24	27	47.1	L	9.4	27	19	54.5		9.0	44	27	32.0	A
8.9	57	0	9.6	A	8.0		49	44.6	B	8.2		44	49.1	L	9.1	28	42	53.0	B	9.2		53	44.5	A
9.5		32	43.1		9.5	35	2	37.6	B	9.5	25	26	12.1		8.4		44	47.4	A	8.7	45	26	0.3	
9.5		41	4.3		9.5		13	39.1		7.5	26	49	48.1	L	8.3		52	24.8	B	8.7		57	39.7	A
9.4	58	11	46.6		7.4	36	38	38.8	A	8.5	28	37	48.6	A	9.2	29	34	54.7	A	9.1	52	9	8.2	
9.4		33	41.2		9.3		49	43.8	B	9.5	29	29	41.2		8.5		49	47.0	A	8.5	54	47	49.1	
9.5	59	5	18.1		9.5		53	31.1		9.1	30	22	31.5		9.5	31	2	2.5		9.5	58	2	26.3	B
9.5		59	31.8		6.5	37	30	2.9	A	9.0	32	48	21.7		9.3		55	25.7	A	9.4	59	51	39.9	B
9.5	3 0	44	46.0		9.4		55	22.1		9.2	33	11	55.4		9.5	32	20	17.8		9.5	7 1	54	40.6	
9.5	2	48	32.3		9.5		59	37.5		9.3		20	45.6		8.5		51	37.9	A	8.0	2	33	59.3	A
9.0		48	47.1	A	9.3	39	19	55.9		9.5	35	59	5.4		9.3	33	45	46.4		9.2		50	59.1	A
8.0	3	51	54.4	A	9.5	40	48	34.8		9.3	37	40	46.6		8.8	36	20	55.7		8.5	3	29	12.1	A
9.4	4	7	29.9	B	9.5	41	0	38.7	B	9.5	41	26	41.6		9.5		53	52.3		9.5	4	40	1.3	
9.2	5	9	50.0	A	9.5		40	9.7		9.5		49	34.4		6.2	37	21	25.4	L	7.5	5	14	47.6	A
9.5		20	4.3		9.5		51	12.1		8.0	43	31	52.8	A	9.4	40	41	38.9		9.0	6	17	44.1	A
9.2		50	52.9		9.0	42	8	27.0	A	9.0	44	33	19.8	A	9.3		53	23.2	A	9.3		52	31.3	
8.8	6	4	38.4	A	9.1	44	10	35.8		8.5		40	18.8	B	8.4	41	46	1.0	A	9.0	8	32	53.4	A
9.5	8	33	23.0		9.3	45	5	13.5		9.5	46	20	17.7		9.5	42	36	49.8		8.4	9	1	11.1	A
9.3	9	2	10.9	B	9.3	46	15	27.8		7.0		30	56.8	A	8.8	44	2	7.4		9.4	10	42	57.3	
9.5		20	1.8		9.5	47	1	14.0		9.5		36	0.4		8.3	46	46	27.7	A	9.0	12	47	49.6	
9.3		20	31.8		8.3		10	26.0	A	9.4		38	29.2	A	9.4	48	4	37.6	A	9.4	15	23	19.3	
9.5	11	3	14.2		9.4	48	11	16.0		8.8	49	42	42.1		9.2	51	19	48.4		5.5		45	45.5	G
9.5		35	52.5		8.8		30	45.6	A	6.5	50	37	46.0	G	9.4		29	27.2		9.2		17	53	51.4	B
8.0	12	5	38.4	L	9.5		36	23.3		9.0		50	23.4		9.5	52	38	6.0		9.4		18	4	35.1	
9.4		18	20.0		6.0	51	32	16.0	A	8.6	51	10	3.4	B	7.8		54	43.8	L	9.3		12	55.4	B
9.5		25	18.7		9.5	54	26	41.5		9.4	52	24	36.7		9.5	54	30	0.6		8.7		26	41.1	
9.5		28	17.6		9.4	57	21	58.1		9.3		31	34.7		7.6	55	1	26.1	L	9.1		42	24.4	
9.3	13	2	20.3		9.0		22	36.5	A	9.2	53	37	4.4		9.0		57	3.8	B	9.5		19	44	41.5	
9.2		9	20.0	B	8.9		30	53.1	B	8.9	54	49	3.9	B	8.9	56	51	56.5		9.4		22	40	49.1	B
9.5	14	52	14.6		9.5		34	45.1		8.8	55	21	28.2	A	9.0	57	6	57.2		8.7		23	16	45.9	B
7.0		59	45.6	L	9.2	58	9	23.3		8.5		36	18.7	A	8.9		8	1.5		9.4		48	45.7	B
7.3	15	25	57.4	L	6.5		20	7.6	A	9.5		58	53.2		9.4		39	43.9		9.3		24	1	21.8
9.3	16	30	35.8		9.5	4 0	9	35.2		9.4		56	26	18.0	A	9.5	59	31	6.9		8.7		28	5	27.6
8.8		40	2.3	A	9.3	1	28	35.7		9.5		58	21	52.0		9.5	6 2	9	5.4				29	22	46.7	A
9.2	17	25	13.6	A	9.5		59	46.5	B	9.5		59	13	11.8		9.2		32	31.1				[illegible]	2	58.5	
9.5		27	43.9		9.5	2	14	46.4	B	8.8	5 0	39	0.1		9.4		36	[illegible]					26	7.6	
9.4	18	0	32.8		9.3	4	8	14.5		9.0		2	18	59.7	B	8.1		40					6	49.1	A
8.9		51	12.2	A	9.3	6	13	53.0	B	8.5		23	47.6	L	7.2	3	54							54.5	A
8.5	19	51	16.0	A	9.0	7	3	31.4	A	9.5		30	20.1		9.5	4								[illegible]	A
8.4	21	20	16.7	A	9.0		10	32.4	A	8.7		40	57.6	B	9.5										
9.1	22	7	27.2		9.0	8	4	8.2	A	9.5	4	4	43.5		9.0										
9.5	23	53	46.0		8.1		48	45.6	A	8.5	5	21	25.5	A	9.2										A

501—560					561—620					621—680					681—740					741—800				
	7h—9h			+68°		9h—10h			+68°		10h—12h			+68°		12h—13h			+68°		13h—14h			+68°
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′
8.8	7	37	43	15.7	9.5	9	2	37	30.3	9.4	10	44	25	55.6	B	9.5	12	13	37	1.4		9.0	13	40	53	49.0	B
9.4		38	33	39.7	B	9.5		3	20	49.6	9.1		45	24	41.7	B	8.9		16	0	59.5		9.3		41	13	16.3	
9.2			33	24.1	A	9.3		4	23	38.5	A	9.5		48	1.5		8.5			42	51.7	A	8.6			49	0.9	A
9.2			48	37.5	A	9.4			37	40.9		8.3		49	0	22.2	A	9.0		19	11	40.3		8.1		43	18	5.5	A
9.1		39	12	26.6	B	9.5		9	38	21.5		9.5			51	50.4		9.5		23	39	43.3		9.2		46	3	33.6	
9.2			21	48.3		9.5		10	15	41.1		9.0		52	24	26.1		9.5			46	27.9		8.8			10	54.2	A
9.2			36	37.9	A	8.7		11	10	19.2		9.0		53	27	9.5		9.5		28	23	28.8		9.2		50	22	6.9	A
9.5		40	37	7.3	A	9.5		15	38	42.1		9.2		54	0	21.0	B	9.4			38	10.7	A	8.0		52	53	37.5	A
9.4			50	27.1	A	9.3		16	3	52.5	A	9.5			36	46.7	A	9.5		32	13	2.4		8.3		53	12	46.9	A
8.0		41	26	37.6	A	9.5			5	48.8	A	9.3		56	19	20.7	B	8.5			32	19.7	F	9.5		55	6	11.8	
8.9		43	27	50.2		9.0		18	1	14.6	A	9.5		57	47	59.5		8.5			38	14.7	F	9.0			24	1.0	
9.4		44	37	11.5	A	6.8			46	9.3	A	6.5	11	0	26	0.1	A	9.0			40	50.6	B	9.3		57	6	46.0	
9.3		45	18	37.1		9.5		19	20	14.7	A	9.3			55	17.9	B	8.0		34	28	37.9	A	8.8			21	45.2	B
9.5		47	12	20.3		9.5		23	11	17.1		8.5		2	54	39.2	B	9.5		35	45	29.4	A	9.3		58	0	49.8	
9.2			59	39.6	A	9.5		24	47	51.7		6.5		3	57	6.6	B	8.1		37	26	33.4	A	9.4			44	52.7	
9.4		48	30	34.4	A	9.5		26	32	49.3		9.4		5	17	19.3		8.8		39	35	55.5	A	9.5	14	0	51	20.6	
7.5		49	49	4.0	A	8.8			38	39.0	A	9.4		6	3	18.8	A	9.5		42	36	48.6		9.3		1	15	43.4	
7.7		51	14	48.7	A	9.5		29	59	23.2		9.2		7	5	19.1		9.4		43	27	46.7		9.5			27	37.5	
9.5			43	22.9		9.2		31	10	10.8		8.3		8	36	40.4	A	9.5		45	35	30.1		8.8		2	12	15.7	A
9.1		53	40	9.9	A	9.5		39	59	19.3	B	9.1		14	25	2.6		9.3		48	50	16.8	B	9.5			28	35.9	
9.5			46	2.1		9.0		41	47	50.3	A	9.4		15	10	17.8		8.6		50	17	29.8	A	9.5		3	27	50.3	
9.2		54	6	5.1	A	8.8		45	33	27.2	A	8.8			35	55.0	A	8.8			54	23.1	A	9.3			37	13.5	A
8.7		55	46	22.0	A	9.5		46	59	51.2		9.3		18	31	48.2	A	6.5		51	22	2.4	A	9.4			52	36.2	
4.8		58	18	54.0	A	9.5		47	37	1.3		7.3		20	34	14.1	A	9.3		54	5	35.4	A	9.4		4	20	12.7	
9.5		59	3	49.3		9.5		48	3	25.5		8.2		21	27	56.0	A	7.8		56	30	32.2	A	9.5		5	2	27.8	
9.5	8	1	18	22.3		9.3		52	10	20.0		9.3		22	0	44.3		9.4			56	0.1		9.0			6	33.8	B
9.5			59	49.2		8.4		53	30	7.4	A	9.1		23	47	8.4	B	9.5		58	2	31.9		9.5			8	19.3	
8.9		5	21	36.4		8.9		54	0	35.9		8.9			55	29.9	A	9.0			3	8.0	A	9.5			30	4.4	
8.5		6	1	44.8		8.4			16	17.5	B	9.5		24	39	50.1		9.0		59	8	6.6	A	9.1			34	7.4	
8.9		8	43	26.9	A	8.4		55	49	2.3	A	8.7		25	39	23.3	A	9.0			26	18.4	A	9.5		9	1	49.3	
8.5		9	4	52.7	A	9.5		59	4	7.4		9.5			44	42.1	B	9.5			39	41.1		8.0			16	16.2	A
8.5		12	34	38.8	F	9.5			32	21.4		9.5		29	36	8.1	A	9.5	13	0	5	38.3		9.4		10	27	8.8	
8.0		13	38	26.6	A	9.4	10	0	7	38.1		8.8			58	58.0	A	9.1		3	57	55.0	A	9.1		12	38	23.6	
9.0		18	5	16.3	A	9.5		1	7	40.3		8.8		31	18	49.2	A	8.5		5	30	16.3	A	8.0		13	8	22.0	A
8.9		25	41	58.9		9.1		2	40	34.4		9.0			45	12.9	A	9.5		6	1	38.8		9.4		16	2	4.3	B
9.5		27	49	3.6		9.5		5	11	12.6	B	8.0		32	18	24.6	A	9.5			14	50.6		9.5			12	10.0	
9.1		30	48	43.7	A	9.1		7	27	11.2	A	9.4		33	7	15.9		7.0		8	1	4.6	A	6.8		17	6	26.6	A
9.2		33	23	30.3		9.4		9	22	52.1	S	8.8		34	11	59.5	A	9.0			8	19.7	A	9.4			35	19.9	
9.4			37	59.9	A	9.5		10	0	55.6	S	8.8			27	31.3	A	9.0			15	1.1	A	9.5			42	53.5	B
9.4			37	50.0	A	9.5			31	2.4		8.7		35	27	23.6	A	6.7			30	2.9	A	9.4		18	1	42.0	
9.0		36	47	18.3	A	9.5		13	32	58.0		9.1		40	24	47.3	A	9.1		10	33	16.2	A	7.4			20	28.4	A
9.0		37	3	11.9	A	9.5			47	9.8		7.0		41	14	8.1	A	8.9			43	47.6		9.5		21	32	54.0	B
9.3			22	47.7		9.4		14	52	21.7		9.5		43	2	19.8	B	7.0		13	21	26.9	A	9.1		23	51	45.5	A
9.5			54	8.9	A	9.5		15	24	32.9		8.4		44	2	39.3	A	9.1		20	27	56.7	A	9.1		25	40	8.5	
9.3		39	22	48.6	A	7.2			38	24.3	A	9.5		45	51	42.8		9.5		21	12	31.3		8.5		26	12	0.1	A
9.3			54	45.6	B	8.5		16	19	6.8	A	7.0		47	56	4.1	A	8.9		22	16	58.5	B	9.5		27	8	28.3	
9.0		45	39	59.8		9.5		17	53	9.3		6.7		50	23	37.4	A	9.4		23	28	59.5		7.2		28	24	43.0	A
9.5		47	12	5.9		9.5		19	37	17.6		9.4			41	33.9		8.7		26	58	39.9	A	9.1		29	20	39.0	A
9.1		48	39	14.2	A	8.8		21	29	53.5	A	9.5		53	6	6.8		9.3		28	49	49.1	B	9.4			45	31.8	
9.4		49	14	25.1		8.7		22	53	38.9		9.5		55	34	56.0		8.2		29	53	31.0	A	9.5			58	46.3	
5.1			25	11.3	A	8.0		23	42	16.6	A	9.5		56	31	33.4		9.4		30	9	23.4		9.5		30	11	5.1	
9.3		50	29	30.3	A	9.0		24	49	19.3	A	9.4		58	25	41.6	B	8.4		32	45	5.8	B	9.2		32	32	20.6	
8.5		52	37	40.1	A	8.9		27	17	24.5	A	9.1			55	28.8		9.0		33	34	6.5	A	9.3			47	18.0	
9.5		55	24	39.0	A	9.5		29	0	43.2		9.3	12	0	29	32.0	B	9.5		34	15	42.1	B	9.4		34	39	46.3	
9.5		57	40	1.9		9.5		31	22	18.6		9.5		3	1	45.7		8.3			41	50.8	A	9.2		36	20	38.6	A
9.4		58	2	36.7		9.4		34	22	56.4		9.4			43	12.6	B	9.2		35	32	31.3		9.1			49	46.9	A
8.0			8	3.2	B	6.2			57	10.2	A	9.4		8	33	13.8	B	9.3		38	42	25.6		9.5		43	8	28.1	
9.4			39	37.6		8.8		37	40	20.9		9.5		10	1	2.4		8.5			57	28.3	A	9.5		44	9	32.1	
9.4		59	10	29.5	B	9.4			57	15.7		9.5		11	17	40.3		9.4		39	14	22.7		9.0			43	5.6	A
9.4	9	0	56	37.0		9.5		41	55	20.5		9.4		13	19	17.4		9.3		40	21	14.7	A	9.2		45	21	48.9	A

801—860					861—920					921—980					981—1040					1041—1100				
	14u—16u		+68°			16u—17u		+68°			17u—18u		+68°			18u—19u		+68°			19u—20u		+68°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
8.9	14	45 36	32.7	A	9.1	16	3 5	56.3	A	9.5	17	13 33	36.5		9.1	18	12 55	25.5		9.3	19	4 21	40.3	A
9.0		58	0.1	A	9.0		58	11.0	A	9.3		51	50.0	A	8.7		14 23	35.7	A	9.4		41	51.8	B
9.4		47 18	10.0	A	8.2		5 28	53.0	B	9.5		14 25	11.9		9.3		39	9.0		9.4		7 20	42.3	
9.4		34	31.9	A	6.0		59	11.4	A	9.4		32	15.3		6.0		16 9	41.8	A	9.2		8 2	17.3	
9.2		48 18	26.5		9.0		9 50	52.8	A	9.5		15 57	46.6		9.5		36	56.8		9.2		9 53	58.2	A
9.3		50 5	58.1		9.5		11 41	29.7		9.0		16 51	36.2	A	9.5		49	34.5	B	8.0		10 16	50.7	A
9.5		51 14	0.2		9.5		12 12	34.4		9.5		18 29	12.4		9.5		17 8	33.5		9.5		43	21.7	
9.5		52 48	2.1		6.5		18 14	53.8	G	9.2		34	16.8	A	9.3		23	3.5		8.8		52	2.2	
7.8		50	32.2	A	9.1		20 20	0.4		9.0		21 13	35.8	A	6.8		52	39.6	A	9.5		11 22	35.8	
9.0		53 34	47.8		8.5		50	15.1	A	8.8		26 27	30.1	A	9.5		18 46	6.0		9.5		12 8	34.5	
9.2		54 47	15.4	A	9.3		23 47	45.5	A	8.5		53	18.9	A	9.5		19 6	6.0		9.3		35	3.4	
9.3		56 25	41.9	A	9.5		24 50	50.3	A	8.2		28 57	36.5	A	9.2		21 8	28.3		9.5		13 15	34.0	
9.4		57 17	17.8		8.8		26 57	17.4		8.6		29 16	56.4	A	9.5		47	11.1		9.1		14 7	59.1	
9.5		38	58.5	B	9.0		27 27	31.4		8.7		30 32	54.4	A	9.0		22 32	49.4	A	9.5		10	32.5	
9.1		58 3	25.1		9.0		59	39.0	A	7.5		31 22	51.5	A	9.3		25 22	59.7		9.4		53	15.8	
9.5		58	57.2		8.5		29 50	59.8	B	9.5		32 22	7.4	B	9.1		34	10.9		8.5		17 10	3.6	
8.0	15	0 47	27.4	A	9.5		31 34	2.0	B	8.3		26	39.1	A	9.1		26 22	35.9		9.5		19 20	16.9	
9.3		3 58	40.5		8.5		32 53	20.1	A	5.5		32	12.9	A	9.5		49	48.5		9.3		22 1	47.8	A
9.5		5 4	10.0		7.2		34 0	18.6	B	9.2		34 56	52.0	A	9.3		29 6	15.8		9.5		8	27.6	
9.0		7 46	51.2		8.1		39 30	36.0	B	7.9		35 6	12.8	A	9.5		14	52.9		9.5		18	19.2	
9.4		48	13.5		9.5		41 28	19.2		8.3		36 4	53.6	A	8.3		30 13	33.3	A	9.3		20	29.6	
8.6		8 32	57.2	B	9.3		42 54	14.8	B	9.0		41	36.5	A	9.5		33 5	22.6		7.3		23 57	43.7	A
6.5		9 14	19.5	L	7.6		58	21.1	B	9.3		43	59.1	B	7.3		15	29.3		9.3		24 48	25.9	
8.7		37	10.0	B	8.1		46 0	30.9	B	9.0		51	54.5	A	8.9		54	52.4		9.5		25 18	38.5	
9.5		16 24	20.3		9.4		54	17.8		7.7		37 16	35.2	A	8.4		34 31	56.7	B	9.1		26 13	38.2	
9.5		42	47.0	B	9.4		47 24	18.5		9.1		16	28.2	B	9.4		35 18	56.7	B	8.7		27 48	21.3	A
9.2		18 29	34.2	A	9.2		31	15.8	B	7.9		24	27.7	B	9.2		31	10.6		9.5		28 10	45.3	
8.3		31	22.4	A	7.5		58	5.5	L	8.6		31	9.0	A	8.7		45	20.1		9.5		58	52.2	
9.5		20 21	16.3		9.5		59	25.4		4.8		49	48.5	A	9.5		36 47	14.3		9.4		29 1	30.0	
9.5		23 54	35.2	A	9.3		49 3	6.9		9.5		39 26	26.0		9.5		37 19	40.0		9.3		17	57.0	B
8.1		24 37	44.3	A	9.3		50 7	57.9		9.5		29	18.3	A	9.3		38 1	49.5		8.2		30 53	25.3	A
9.5		28 6	59.1		9.5		51 4	1.1		9.5		41 36	28.6	B	9.3		33	40.4		9.1		55	20.1	A
9.5		18	2.1		7.7		52 11	9.0	A	9.1		43 2	57.3	A	9.4		39 26	20.7		9.4		32 17	57.6	
9.3		34	13.4		8.9		16	1.0	A	9.5		44 26	28.2		8.5		32	46.0	A	9.5		45	10.8	
9.5		29 16	39.4		9.1		49	37.1	A	9.5		44	35.1		8.5		34	54.3	A	8.8		38 1	39.4	
9.4		30 33	13.3	B	8.4		54 36	41.2	A	9.5		55	40.7		9.5		41 13	9.4		9.5		39 9	33.9	
9.3		37	29.9		9.5		55	14.9		9.5		45 54	37.4		8.8		42 16	55.9	A	7.5		13	19.6	A
9.2		31 0	30.8	B	9.5		55 32	37.2		9.3		46 3	7.4	A	9.5		46 23	39.5		8.5		43 30	59.1	A
9.4		20	31.4		8.0		35	11.3	F	9.5		28	17.7		7.8		29	34.6	A	6.2		44 30	59.5	A
9.4		32 46	44.4		8.3		56 1	6.9	L	9.5		47 27	35.7		9.4		47 11	58.9	B	9.1		56	4.8	
9.4		54	32.2	A	9.0		47	14.4		7.7		49 49	22.6	A	9.5		35	5.8		9.5		45 43	46.8	
6.8		33 38	17.8	A	9.3		57 20	28.4		9.2		50 12	26.6		9.4		49	6.8	B	6.4		46 34	4.4	F
9.0		42	27.6	A	9.1		34	22.1	A	7.4		19	43.3	B	9.3		48 56	28.5		9.5		48 45	51.4	
9.1		36 48	42.0	A	8.6		47	47.7	A	9.5		53 28	15.2		9.3		49 8	9.4		8.3		50 27	15.8	A
9.3		38 5	50.6	A	9.5		58 18	45.8		8.5		56 4	31.6	A	9.5		12	57.8		9.3		32	12.3	
9.0		9	37.5	A	8.3		25	54.6	A	9.5		57 41	42.1		8.5		26	25.4	A	9.5		51	30.0	
9.5		58	32.6		9.5		59 9	27.1		9.0		57	49.1	A	9.1		26	41.8		9.5		53 15	42.8	
8.3		40 0	54.2	A	7.5		55	51.8	A	8.3		58 4	1.5	A	9.5		51 16	38.0		9.5		49	45.3	
7.8		43 9	48.2	B	9.5	17	0 49	40.1		9.5		29	3.0	A	9.4		52 51	13.8		8.9		54 7	8.2	B
9.0		44 39	36.2		9.5		1 28	17.8		8.9	18	0 25	51.0	A	9.4		53 3	18.7		9.5		50	35.5	
9.5		45 50	35.9	A	9.5		43	39.6		9.1		1 18	33.3		9.1		47	28.7		9.4		59	6.1	
9.0		46 9	57.2	A	8.9		2 58	3.5	A	7.7		55	35.6	A	9.5		49	37.3		9.4		55 42	11.1	
8.8		34	41.7	A	9.5		5 20	28.1		9.5		3 26	19.5		8.8		55 22	7.9	A	9.4		57 4	6.5	
9.5		50 14	47.4		8.8		43	16.4		9.5		4 8	2.0		9.5		56 7	29.3		9.5		53	33.4	
9.5		52 1	6.0		9.5		9 37	49.0		9.5		5 53	59.3	A	7.0		57 15	5.9	A	8.8		58 0	44.8	
9.5		53 26	39.2		9.2		10 27	23.2	A	9.1		8 17	32.1	B	8.6		58 3	22.1	A	7.5		14	1.5	A
9.5		57 9	57.8		9.0		11 2	57.8	A	8.5		56	22.7	A	8.6		23	18.9	A	7.5		59 40	3.9	A
7.7		59 49	2.1	A	9.2		19	51.5		8.2		9 40	32.6	A	8.5		59 24	45.5	A	8.5	20	0 31	49.6	
9.2	16	0 10	29.0	A	9.5		55	31.3		9.5		10 22	38.4		8.1	19	1 26	29.8	A	9.5		1 17	28.1	
9.5		1 5	17.7	A	8.0		12 11	59.5	A	9.0		53	48.2		7.0		3 4	6.				52	57.[illegible]	

1101—1160					1161—1220					1221—1280					1281—1340					1341—1400				
	20u		+68°			20u—21u		+68°			21u—22u		+68°			22u		+68°			22u—23u		+68°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
9.3	20	3	35	47.3	8.4	20	50	14	28.2	A	9.5	21	28	3	49.0		9.4	22	6	25	30.9		9.0	22	50	30	22.0
9.4			42	9.4	9.5		51	35	59.0		9.5		29	2	1.4		9.3			29	11.6		9.5		51	39	52.8
8.7		4	36	43.8	A	8.4		40	1.4	A	8.8			47	6.7		8.8		7	14	21.7	A	9.5			55	6.6
9.2			55	48.8	A	9.2		52	45	4.9	9.5		30	4	56.8		9.5			31	46.5		9.0		52	0	4.1
9.5		5	10	38.0		8.6		53	7	18.4	A	8.7			9	8.2	B	9.0			35	56.8		8.3		53	28	14.9
9.1			43	53.6	A	9.4			7	21.7		9.1			13	14.2		8.0			38	8.4	B	9.3			38	47.3	B
9.5		6	6	2.0		9.5			30	17.7	B	9.5			41	26.8		7.3		9	18	15.0	A	9.5		54	12	18.9
9.3			55	5.6	B	9.4			59	40.3	B	9.5		31	45	9.7		9.0			41	3.0	A	9.2			26	40.0
9.5		8	12	31.2		8.5		54	49	50.0	F	8.7		32	43	35.9		9.0		10	42	0.1	A	8.7		56	23	26.3
7.4			50	10.8	A	6.5		55	49	29.8	A	8.7		35	1	36.7	B	9.3		11	1	12.1		9.3		57	15	34.5
9.5		11	33	57.1		9.4		56	50	24.0		9.1			10	38.7		9.5			35	18.0		9.5			32	36.1
9.5			52	33.5		9.1		57	2	28.3	A	9.5			23	19.1		9.5			54	36.3		9.5		58	15	27.6
9.5		12	31	46.3		8.8		58	6	14.2	A	9.2			31	47.4	R	8.5		14	31	0.1	A	8.7	23	0	20	29.6
9.0		15	56	48.3	F	8.5			24	46.7		8.7			35	41.5		9.3		16	12	27.4		9.4		1	0	38.4
9.5		16	0	32.7		9.4			35	20.3		9.2		36	1	0.8		7.8			46	37.6	A	9.5			38	38.2
9.5			51	27.8		9.3		59	33	20.9		8.8			24	6.8	A	9.3		17	41	24.3	B	9.5		2	49	4.1
9.3		17	43	55.7		9.1	21	0	20	5.4		9.2			47	48.9		9.5			58	0.6		9.5		4	6	7.6
9.4		18	32	20.6		9.5		1	16	9.3		8.7		37	22	26.0	A	8.7		18	22	54.9	A	7.8			33	1.6	A
9.5			46	5.9		9.5		2	28	36.4		8.8			59	50.8	R	9.5			49	51.4		8.5		6	15	41.7
9.5			58	47.7		8.8		4	21	40.8	A	9.1		38	30	30.1		9.5			56	18.5		9.1		7	25	15.4
6.0		19	27	24.8	S	9.5			33	15.7		9.1			39	1.4		8.8		20	50	56.5	A	9.1		8	7	17.9
9.5			41	9.4		9.4			41	31.6	B	9.5		39	41	17.8		9.5		21	46	31.6		9.0		9	17	19.1	A
9.4		21	10	18.2		9.3			46	1.7	B	9.5			52	30.4		7.7		22	13	17.6	F	9.2		10	38	49.1	
9.4		24	24	24.5		9.5			48	40.2		7.8		40	9	23.3	A	9.3		23	40	51.0		9.1		11	5	14.9	
9.5			51	41.6		9.5		5	3	46.7		9.5			27	18.0		9.5			46	12.5		7.8			46	51.0	A
7.0		25	30	50.0	G	9.0			4	3.9	A	9.5		41	8	15.1		9.5		24	15	30.8		9.5		12	8	15.4	
9.5			58	49.1		9.1			8	13.7		8.5		42	38	54.3		7.5		25	18	41.1	A	9.4		13	32	30.3	
9.5		26	27	49.6		8.2			29	1.0	A	9.5			39	23.8		8.8		26	3	37.3	A	9.2			41	48.2	
7.2			29	17.7	A	9.1		6	13	33.9		9.5		43	25	2.3		9.0			51	27.4		9.5		14	45	43.2	
9.4		27	8	20.6		8.8		7	0	32.8		9.5		44	28	20.0		9.5		27	1	31.3		9.4		15	54	37.3	
9.1			12	28.9	A	9.4			4	59.2		9.5			51	1.8		9.5			38	7.3		9.5			58	16.5	
9.4			26	26.2		9.5		9	23	12.5		8.5		45	16	38.6	A	9.5		29	42	28.8		9.0		16	44	23.1	
8.5		29	46	45.7	A	9.5			50	19.5		9.5			49	55.3		9.4		30	2	29.5	B	8.5			51	12.9	B
9.0		30	39	3.4		9.5		10	49	49.4		9.5		46	0	17.6		9.4			44	42.5		9.1		17	4	36.6	
9.3		31	8	17.2		8.5		14	3	18.4	B	9.5		48	42	47.5		8.6			59	37.2	A	8.2		18	19	29.0	A
9.5			24	53.0		9.3			26	25.9		9.5			46	44.0		8.0		31	45	19.3	A	7.2		19	34	10.0	A
8.5		32	19	21.3	F	9.4		15	5	39.5		9.5		50	42	28.8		9.5		32	1	15.4		9.3		20	24	28.7	
9.5			22	21.5		9.4			35	19.0		8.5			46	6.8		9.5			25	13.9		9.4		21	35	35.6	
9.3		35	31	58.0		9.4			56	16.5		9.5		51	7	59.7		7.3			55	27.3	A	9.5		24	34	17.9	
8.8			43	4.4	A	9.2		16	13	54.4	B	9.3		53	13	18.6		9.5		33	54	40.5		9.3		25	9	37.6	
9.0		38	3	15.2		9.5			35	21.7		9.2			37	58.3		9.1		35	0	41.5		9.3		28	44	27.2	
9.5		40	14	30.4		8.8		17	8	38.6	A	9.5		54	25	48.5		9.5		36	8	28.2		9.4			54	49.1	
9.5		41	15	39.7		9.0			38	50.2		8.8			33	1.8		9.5			33	10.2		9.0		29	30	42.4	B
9.2			20	5.9		9.0			52	54.9	A	9.0		56	26	49.9		9.5			48	18.8		8.0		31	11	18.1	A
9.2			49	28.9		9.0		18	8	46.9	A	9.0		57	20	4.3		9.0			52	37.5		8.6			25	36.4	
9.2		42	4	50.0		8.0			13	56.3	A	8.6			23	24.3		9.2		38	23	44.5		9.4		32	40	38.1	
9.4			23	27.6	B	8.8			14	48.9	A	9.5			50	37.5		9.5			52	20.8		8.9		35	9	34.8	
9.5			33	2.9		9.5		19	8	20.9		8.7	22	0	19	28.6		9.5		40	5	18.8		9.5		36	21	14.7	
9.5		43	23	37.0		9.5			15	39.5		9.2			40	44.5		9.5		41	51	1.1		9.5			26	52.8	
9.2			39	48.1	B	9.1			24	1.3		9.4			54	21.4		8.5			57	40.5		9.5			40	41.0	
9.4			50	37.2		9.4			33	56.8		9.2		2	3	4.2		9.0		43	21	18.8		8.5		37	7	15.7	
9.4			53	38.8		9.0		20	40	53.3		9.4			12	5.1		9.0			47	6.6		9.2		38	6	50.8	A
9.2		44	8	20.6	A	9.3			54	49.4		9.5			59	0.4		9.2		46	4	40.0		6.8			12	56.3	A
9.3			9	37.9	B	7.0		21	43	54.6	A	9.2		3	59	12.1		9.5			21	38.7		9.2		39	7	38.8	A
8.3			25	1.4	A	9.3			45	47.5		9.2		4	3	17.6		9.3		47	2	40.8	B	9.2		40	15	14.6	
9.3		46	58	34.5	B	9.2		23	10	39.5		9.0			25	51.3	A	9.3			6	38.9	B	9.3		41	26	42.2	
8.1		47	5	35.8	A	9.4			27	34.1		9.5			39	56.0		9.5			14	46.0		9.1			41	43.5	B
9.5		49	19	55.5		9.5			56	1.2		8.5		5	13	51.3	A	9.5			28	33.3		9.1		42	30	33.0	
9.5			20	4.9		9.5		24	55	1.8		9.1			19	56.7	B	9.0		49	16	44.5		8.8			38	30.5	
9.4		50	1	25.1		9.5		26	59	0.1		9.0			37	32.1	B	9.0			26	12.9		8.9			43	23.6	

1401—1406					1407—1412					1413—1418					1419—1424					1425—1429				
	23ᵘ		+68°			23ᵘ		+68°			23ᵘ		+68°			23ᵘ		+68°			23ᵘ		+68°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.5	23	42 51	33.5		9.5	23	47 16	9.3		9.4	23	51 15	26.0		9.5	23	54 38	6.9		9.4	23	57 34	19.2	
8.1		43 23	41.9	B	9.2		36	54.3	A	7.8		21	31.9	F	9.3		42	25.4	A	7.0		51	3.9	A
9.1		44 37	20.7		9.5		57	27.5		9.5		43	7.4		9.3		55 31	36.9		9.5		59 16	2.0	
9.0		59	47.5		9.4		49 7	11.3		8.7		53 37	43.0	A	9.5		38	53.7		8.9		51	29.8	
9.4		45 20	40.8		9.5		59	21.2		8.0		40	47.5	A	8.2		56 20	4.1	A	7.9		57	16.1	G
9.3		46 22	55.3	A	8.3		50 49	39.1	F	7.5		45	46.0	A	9.5		32	33.4						

Zone +69°

1—40					41—80					81—120					121—160					161—200				
	0ᵘ		+69°			0ᵘ—1ᵘ		+69°			1ᵘ		+69°			1ᵘ—2ᵘ		+69°			2ᵘ		+69°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.5	0	0 10	52.8		9.2	0	36 12	48.4	B	9.2	1	7 50	21.7		8.6	1	42 0	19.4	A	8.6	2	22 34	1.5	
9.5		1 15	34.6		9.4		13	31.4	A	9.2		8 7	21.1	B	8.0		43 53	46.1	A	9.1		57	13.0	
9.5		15	10.0		8.6		39 56	2.2		9.5		34	13.5		8.0		45 1	29.9	A	9.5		23 0	14.1	
9.2		2 0	18.8		9.1		40 13	31.5		9.5		42	13.0		9.4		6	24.1		9.4		24 13	55.2	
9.0		9	17.9	A	7.8		26	39.4	G	9.3		50	30.0		9.0		46 11	37.4		9.5		48	42.3	
9.4		29	13.3		7.0		50	58.6	G	9.1		54	8.4	B	9.3		47 31	55.9		9.0		56	27.0	
9.5		33	51.2		9.5		41 46	36.5		9.5		9 2	15.4		9.3		41	58.0		9.1		25 11	22.5	
9.2		5 41	53.2		9.4		42 11	22.6		9.2		11 8	17.3		9.3		51 50	25.5		9.1		30	17.2	
9.5		6 2	54.3		9.5		43 11	34.0		9.0		42	38.9		8.8		57	30.0	A	9.5		26 47	29.0	
9.5		20	50.9		7.5		44 6	10.3	L	9.5		13 13	59.6		9.1		52 4	54.4	B	9.1		59	53.5	
8.5		7 3	32.8	A	9.5		20	18.7		9.5		34	50.7		9.0		54 23	47.6	A	8.0		28 47	3.9	A
8.3		33	45.4	A	9.3		44	8.9		8.8		37	37.4	A	8.9		59	53.3	A	9.5		29 25	22.5	
8.8		9 29	7.1	A	9.4		46 18	0.1	A	8.8		39	40.2		8.5		55 14	15.2	S	8.7		30 18	34.3	A
9.0		11 12	15.0		8.2		47 12	39.9	A	9.2		15 29	47.8		8.8		35	57.8	A	9.4		32 35	31.8	B
8.8		49	4.2	A	6.8		48 43	43.2	A	9.1		40	21.4		9.0		43	36.4		8.7		33 8	37.6	A
9.5		13 29	3.2		9.3		49 7	14.7	A	8.0		16 14	37.8	B	9.0		56 23	11.3	L	9.5		34 17	9.7	
9.0		14 16	11.0	A	9.5		36	18.1		9.1		17 0	32.8		9.3		25	0.5		9.1		35 8	37.1	A
8.4		16 3	10.4	A	9.5		50	28.3		8.5		18 26	48.1	A	8.9		56	49.7	A	9.5		46	20.0	
9.5		17 20	51.2		8.9		51	35.3	A	8.8		19 30	52.2	A	8.5	2	4 12	48.8	A	6.5		55	0.8	A
9.5		20 5	0.1		9.1		51 40	8.5		8.5		20 16	50.3	A	9.5		6 31	58.0		8.1		59	52.4	A
9.4		33	34.5		8.3		52 3	45.4	A	9.5		18	7.9		9.4		9 0	29.5		9.0		37 1	16.0	A
9.5		21 20	44.7		9.4		34	42.3	A	6.1		32	31.3	A	9.0		15	46.1	F	8.0		6	53.1	A
9.2		23 33	43.8		7.5		53 28	32.6	A	7.0		21 54	17.0	A	9.3		19	8.0		9.4		39 42	30.3	
9.5		24 42	10.3		9.5		54 32	35.0		9.3		22 33	25.5		8.0		10 38	38.9	F	8.8		43	11.8	
9.5		25 45	58.1		9.2		39	53.4	A	9.0		24 2	8.8	A	8.6		11 6	14.5		9.5		40 38	55.1	
9.5		48	48.5		9.5		55 6	50.5		9.1		25 23	12.7		9.3		33	23.0		9.5		41 43	54.8	B
9.5		26 14	16.8		9.3		41	9.0		8.2		24	31.3	F	9.5		12 31	2.4		9.5		42 20	28.9	
9.0		27 38	58.6	A	8.4		52	32.4	A	9.4		28 21	19.0		9.3		13 [illegible]	56.5		9.5		45 44	49.5	
7.8		28 0	45.7	A	9.5		58 34	31.5		9.5		31	2.8		9.4		14 [illegible]	[illegible]		[illegible]		46 14	36.7	
9.5		30 23	34.0		7.7		47	54.7	A	9.1		30 36	40.6		8.8		17 [illegible]	45 [illegible]		[illegible]		49 59	18.0	A
9.5		31 32	15.3		9.4		59 14	44.8		9.5		41	20.0		9.4		18					50 4	41.1	
7.0		37	54.8	A	9.5		21	59.5		9.3		31 4	25.7		9.3							51 17	9.3	
8.9		33 50	33.4	A	9.3		26	46.8		8.3		39	26.1	A	8.9							22	52.1	
8.9		57	59.9	A	9.1	1	0 35	7.0		5.2		47	52.2	A	9.[illegible]							[illegible]	38.7	
9.5		34 13	50.1		9.1		46	8.0		9.3		50	1.6		8[illegible]								59.0	A
9.5		22	9.5		9.2		2 20	36.0		9.4		34 10	17.4		[illegible]								39.7	A
9.5		43	36.4		8.6		5 50	20.4	B	9.3		35 39	27.5										59.7	
9.4		55	26.1	A	8.8		56	30.0		8.5		36 59	50.3	A									9.9	
9.1		35 8	46.3	A	9.5		7 6	46.8		9.3		39 55	22.5										[illegible].6	A
9.5		20	32.5	A	9.3		48	8.9		9.5		40 42	53.7										[illegible].8	

201—260					261—320					321—380					381—440					441—500				
	3ᵘ—4ᵘ		+69°			4ᵘ—5ᵘ		+69°			5ᵘ—6ᵘ		+69°			6ᵘ—7ᵘ		+69°			7ᵘ—8ᵘ		+69°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
9.5	3	0	38	26.9	8.3	4	18	18	17.0	A	9.5	5	12	45	9.5	9.5	6	12	21	37.2	9.5	7	35	30	45.1
9.2		1	3	57.6	9.3		20	10	12.2		9.4		50		5.0	9.3		30		26.4	A	9.2		36	3	22.5
7.7		2	49	26.2	A	9.2		23	21	18.1		7.8		55		12.0	B	9.5		14	36	53.1		8.8		39	10	41.3
8.8		3	40	46.0	A	9.2		24	53	5.7		9.4	13	13		50.8		9.4		17	16	25.5	A	9.5			11	55.8
6.5		6	16	11.7	A	8.0		25	0	59.0	B	8.2		52		21.7	B	8.0		21	0	28.4	A	8.6		41	39	15.2	B
9.4		7	42	40.7		9.5		26	21	59.2		9.0	17	22		38.7	A	9.5		27	47	28.7		9.5		42	3	54.3	B
9.5		9	8	7.3		8.0		27	1	38.7	G	7.3	18	4		33.1	A	9.5		28	55	45.0		9.4			13	45.6	B
9.2			50	25.9		9.3		28	19	59.8		9.5	19	13		36.1	A	9.5		29	9	27.8		8.5			22	9.0	B
8.6		10	2	44.1	B	9.1		29	42	8.3		9.2		53		19.9	A	7.7		31	25	46.4	A	9.5		43	27	36.8	
9.5		13	10	27.9		8.3		30	3	31.8	A	9.5	20	29		44.0		8.8		34	5	38.4	B	8.0		45	3	19.6	B
9.1			43	12.2		9.0			56	48.5	A	9.3		55		2.9		9.2		35	10	48.9		8.9		46	4	38.0	A
9.4			57	54.6		8.5		31	33	58.5	A	9.5	21	27		32.5		9.1		37	45	37.1	A	8.9		47	43	46.6	A
9.5		14	2	55.1		8.2		33	20	30.5	A	9.3		43		57.8		9.5			52	55.6	A	9.4		54	11	47.2	
8.9		17	0	14.9		9.4			34	32.7		9.3		55		6.6		5.2		38	2	3.2	G	9.3			55	44.6	
9.0			32	26.9	A	9.1		34	48	49.8	B	9.4	22	0		38.7	B	9.5			27	19.4		8.9		56	14	51.1	
9.1			34	11.8		9.5			52	51.0		9.0		24		19.2	A	9.0			27	50.4	A	9.1			18	50.1	
9.0		20	53	31.8		9.5		35	3	20.5		9.5	23	5		10.0		9.5		45	20	58.2		9.3			45	31.9	
9.5		21	31	41.6		8.5		36	56	21.4	B	9.2		13		46.8		6.8			50	50.4	A	9.3		59	4	0.5	
9.2		23	12	0.4		9.5		37	25	20.4		7.1	24	1		53.0	B	8.2		46	40	40.0	A	8.4	8	0	39	48.8	A
9.4		24	18	1.1	B	9.0			37	47.0		9.5		43		15.9		7.5			57	23.7	A	9.5		1	12	53.5	
8.9		25	48	11.8	B	9.5		39	31	29.8		9.4	28	54		56.9		9.5		47	33	38.7	A	8.4		3	59	16.2	A
7.2		28	15	22.6	A	9.3			35	15.5		9.2	29	24		10.0		8.2		48	49	6.2	A	7.8		7	4	29.4	A
9.5		30	28	9.7		8.8		42	16	24.3		8.9		41		12.4	A	9.5		50	53	41.5		9.0			58	20.5	A
9.0		32	26	37.2		8.8			29	16.5		8.7	30	14		38.9	A	8.0		53	51	34.5	B	7.2		9	32	22.0	A
8.5			55	45.0	A	8.3		43	21	4.2	S	9.5	34	8		29.1		8.3		55	7	6.9	B	9.4			52	12.3	B
9.5		33	42	0.9		8.4		44	4	50.6	S	9.1	35	19		41.9		9.3			51	30.2		9.3		11	36	12.3	
9.5		37	14	25.9		9.5			17	1.8		9.4		45		41.9		9.5		56	43	36.5		8.7		12	13	3.6	F
9.3		38	20	49.4	A	7.8			19	41.9	J	8.5	41	1		8.9	A	9.5			53	40.8		9.4		14	16	56.6	
8.0		39	50	45.5	A	9.2			43	11.4	A	9.5		28		53.7		9.3		57	19	25.3		9.4		15	25	7.9	
9.4		41	44	25.0	A	8.5			50	11.1	A	7.3	42	0		34.1	B	8.8			44	13.0		6.7		16	35	0.0	A
8.0		42	27	4.8	A	9.5		45	16	50.0		9.2		51		28.7	B	9.4		58	41	30.2		9.5		17	11	13.7	
9.5		45	7	22.0		9.1		46	3	37.6		9.2		57		47.8		9.5			46	47.0		6.5		18	30	49.0	A
9.1		46	27	29.8		8.7		47	49	51.3	A	9.1	43	6		28.5	B	7.6		59	25	2.2	B	9.2			47	42.7	A
9.0		52	9	3.8		8.7		49	35	10.7	A	9.4		15		1.7	A	9.5	7	3	44	47.0		9.5		19	17	16.9	
8.4			53	28.3	A	8.9			38	9.7	A	8.2		34		22.7	A	9.5			58	56.3		9.5		22	18	16.7	
9.0		53	28	49.8	A	9.5		50	35	59.7		9.5		49		10.9	A	9.2		4	16	26.8		9.5		23	16	29.3	
9.5			51	41.1		9.0		52	0	19.5	A	9.2	45	52		46.3	A	8.5		5	59	55.6	A	9.3			23	32.8	
8.1		54	40	9.3	B	8.5			31	43.0	A	9.4		56		12.5	A	9.4		6	46	27.3		8.0		25	9	27.2	A
9.0		55	19	12.6	A	8.8			57	26.3	A	9.5	49	20		24.7		8.7		9	57	1.8	A	9.5			23	10.2	
8.3			26	56.8	A	9.0		53	5	28.6	A	9.5		50		28.9		8.5		10	9	43.4	B	8.5			29	39.6	A
9.5		57	16	14.8	B	8.5			26	39.2	A	8.1		50	6	28.3	B	9.4			14	53.9	B	9.5		27	21	54.7	B
9.0			27	31.3	A	6.5			46	25.8	A	9.3		51	33	15.4		7.5			45	45.4	A	9.5		28	54	41.1	
7.5		59	23	7.7	A	9.5		54	0	52.2		9.0		52	7	24.2		9.5		11	38	26.8		9.4		32	10	36.3	
9.3	4	0	55	27.3		9.2		55	32	56.3	A	9.3		54	17	42.8		9.5		12	59	34.7		9.3			43	30.4	B
9.3		2	1	13.7		8.8		56	5	50.9	A	9.5		55	3	36.0		9.0		15	20	18.0		9.2		33	36	20.5	A
9.0			19	7.7	B	9.5		57	30	28.8		9.3			38	50.8	A	9.5		17	6	3.2		9.4		35	13	59.5	
9.2		3	37	48.5		7.0		58	23	38.6	A	9.3		57	34	42.8		9.5			17	30.7		9.3		36	20	53.9	
9.1		4	55	57.5	B	9.5		59	46	38.6		7.0	6	1	1	30.1	P	9.4			27	59.7		9.4		40	24	58.6	
9.1		5	8	58.4		9.5	5	1	56	24.8		8.8			56	12.0		9.4		19	2	48.4		9.5		41	30	21.4	
9.2		7	32	14.1	A	9.5		2	3	14.5		9.5		2	7	55.9		9.1		20	1	53.6	B	8.2		42	12	0.8	A
9.0		8	6	10.6	A	9.4		3	4	57.9	B	4.7			50	21.7	G	9.5		21	24	8.1		9.2			26	37.7	A
9.5		9	27	34.2		9.5			12	45.5		9.2		3	8	42.0	A	7.9		23	59	38.9	A	9.4		43	20	59.8	
9.4		10	56	45.5		9.1			19	15.0		6.8			30	36.5	A	8.8		24	20	48.2	A	8.7			40	41.6	A
9.5		12	43	1.3		9.2			38	58.8	B	9.3		4	1	2.7	A	9.0			39	56.2	A	8.5		44	44	48.4	A
9.0		13	59	47.0		8.0		7	10	14.5	A	9.1			40	7.8	A	9.0		25	31	34.6	A	9.4		45	56	27.5	A
9.0		14	0	56.2		8.0			33	45.9	A	9.3		5	39	15.1		6.8		27	57	40.3	A	9.3		46	25	36.8	A
9.3			30	10.3		8.0			35	25.3	A	9.5		6	36	5.8	A	9.5		28	47	21.1		9.5		47	10	36.3	A
7.0			41	2.4	L	9.3			37	51.4		9.4			56	3.3	A	7.2		31	55	29.9	A	9.5		48	56	46.5	B
9.3		15	49	34.2		8.0		9	14	5.7	A	9.5		10	19	21.2	A	8.5		34	53	13.7	A	8.3		49	5	26.0	A
9.0		17	13	49.0		9.4		12	41	48.6	B	9.3		12	14	17.6	A	8.9		35	30	19.7	A	9.4			45	30.2	

501—560					561—620					621—680					681—740					741—800				
	8ᵘ—9ᵘ		+69°			9ᵘ—11ᵘ		+69°			11ᵘ—12ᵘ		+69°			12ᵘ—14ᵘ		+69°			14ᵘ—15ᵘ		+69°	
m	ᵘ ′ ″		′		m	ᵘ ′ ″		′		m	ᵘ ′ ″		′		m	ᵘ ′ ″		′		m	ᵘ ′ ″		′	
9.4	8 50	25	32.2	B	7.0	9 58	4	23.0	A	9.0	11 32	49	16.7	A	8.0	12 53	36	33.5	B	7.3	14 15	6	25.2	B
9.4		55	19.1	A	8.9	59	38	53.0	A	8.7	33	8	45.2	A	9.4		52	47.5		9.3		19	59.0	
8.6		59	36.2	A	9.3	10 0	57	56.5		9.5	35	43	54.4		9.3	55	25	45.6	A	7.7		22	54.5	S
7.3	53	7	1.5	A	9.5	2	32	3.4		9.5	36	57	37.3		9.5	56	27	17.5		9.4		42	26.0	
9.5	54	20	47.5		9.0	4	50	13.7	A	8.3	37	38	43.2	A	9.0		39	47.1	A	9.5	16	54	37.9	
8.0	55	35	47.7	L	9.1	6	15	32.4		9.5	39	7	27.0		9.5		42	1.3		9.0	18	2	7.1	A
9.3	56	19	28.3		7.7	9	28	45.0	A	9.5	40	46	59.4		9.0	13	1	50	2.8	A	9.4	23	26	2.7	
8.7		31	43.4	L	6.0		58	28.9	A	7.0	43	28	38.7	A	9.5		3	46	25.4		9.0	25	24	17.0	A
8.5	58	32	37.8	L	7.5	11	0	39.2	B	9.0	44	45	11.7	A	8.5		4	25	7.2	A	7.5		43	54.0	B
8.7	59	3	40.4	L	9.5	12	21	52.0		9.5	47	4	16.7		9.5		32	42.1		8.4	26	44	40.6	A
9.5		24	52.6		8.8	13	35	39.0	B	9.5	48	1	38.8		9.5		5	50	0.5		8.3		55	55.2	A
9.4		57	36.8	A	9.0	16	25	35.6	B	9.5		33	1.9		8.5		8	20	45.6	A	9.3	27	25	40.1	
9.4	9	1	12	14.6	9.2	19	39	9.8		8.8	50	47	35.0	A	9.3		11	7	0.7	B	9.5		35	15.8	
8.8		4	3	40.7	A	7.9	20	40	3.4	A	9.4	52	4	40.2	B	6.0			41	10.2	A	9.1	29	9	22.1	B
8.8		5	24	41.0	A	9.5		51	36.6		8.9		8	50.9		9.4		13	54	35.2	A	9.1		28	24.1	A
9.2		8	34	40.6		8.2	24	7	36.3	A	7.0	53	5	59.7	A	7.1		16	14	52.1	A	8.6		30	23.1	A
7.4		10	14	58.2	A	7.7		13	27.1	A	9.5	54	27	6.4		8.7			45	28.0	B	8.9	32	10	19.6	A
7.8		11	11	28.7	A	9.5		21	8.5	A	6.6	56	10	49.7	R	9.5		17	3	17.3		9.1	33	16	39.3	A
9.0		16	18	38.2	A	7.9	25	27	40.1	A	8.0		17	44.6	B	9.5		21	18	16.4		9.5	34	9	34.1	
9.0			25	23.7	A	9.5	28	8	52.4		9.5	57	15	8.3		9.4		24	2	46.3		9.4		45	17.4	
9.4		18	9	12.1		9.5		17	13.1		8.2	58	15	33.4	A	9.2			4	12.2	B	8.3	35	23	3.6	A
9.5		22	12	43.8		9.5		42	41.4	B	7.5		15	36.3	A	9.4		26	16	9.5		9.4	36	48	34.5	
9.5			29	26.7		5.5	31	28	11.1	A	9.0		44	35.4	A	8.0			29	1.5	A	9.5	37	43	41.2	
9.5			55	47.7		8.3	32	5	22.4	A	7.0		45	29.7	A	9.5		27	28	59.8	A	8.8	39	15	52.2	B
9.5		24	57	8.0		9.3		13	17.6	J	7.8	59	52	52.8	A	9.4		28	8	38.4		8.9	40	16	44.9	A
8.2		26	20	56.6	A	4.7		38	49.2	A	9.3	12	1	43	46.7		9.5		29	51	53.7		9.3	41	18	48.2	
9.0		28	5	28.0		var	34	19	32.1	B	8.3		2	31	22.0	A	9.0		31	49	19.2		8.8		36	45.5	A
8.0			15	11.9	A	9.4		52	2.3	B	8.5		3	26	30.9	A	9.5		32	20	58.0		9.1	42	43	0.3	
9.5			31	15.3		9.5	35	21	57.6	B	8.5		4	50	25.5	A	9.5		33	57	37.5		9.2	45	45	54.8	A
8.9			45	57.8	A	9.5	37	19	23.4		9.5		5	10	40.8		8.8		36	12	28.7	A	9.4		47	10.1	B
6.1		29	50	52.9	A	9.5	41	37	45.0		9.4			39	42.7		8.9			18	28.6	B	8.8	46	18	25.9	A
9.1		32	47	27.6		8.6	46	31	20.4	A	9.5		6	27	6.8		8.8		38	43	8.5		8.4	48	51	50.5	B
9.1			50	21.2		9.2	49	20	2.8	R	9.3			41	58.4		9.5			44	52.7		8.8	49	35	50.4	B
9.5		33	39	50.7		9.5	51	20	25.9		9.3		7	0	20.1	A	9.0		39	10	28.6		9.4	51	21	5.0	
9.2		35	25	9.4	L	9.1		36	5.8		9.2		8	52	57.7	A	9.5		40	35	26.1		8.0	52	33	21.7	B
9.5			27	57.9		9.4		54	15.6		9.4			57	52.7		7.2			47	57.5	A	8.2	53	49	48.8	B
9.5		37	13	41.8		8.2	52	12	59.1	A	7.7		11	10	36.1	B	7.5		41	37	43.3	A	9.2	57	55	11.9	A
9.5		39	20	8.4		9.2	53	9	57.8	A	9.3			49	26.0		9.0		42	19	50.4	A	9.5	58	6	57.0	A
9.5		40	59	18.8		9.2		56	29.0	A	8.8			54	22.0	B	9.1		43	14	56.6	A	9.4	59	1	29.6	A
9.4		41	10	43.4	B	8.2	58	27	9.3	A	9.3		13	45	29.9		9.1		45	19	4.0		9.1	15	1	6	6.5	A
9.4		42	55	38.2	S	9.2	11	2	5	15.6	B	8.0		16	5	20.1	A	9.3			26	21.7		9.5			22	43.3	
8.5		43	3	34.9	A	6.2			57	2.4	J	9.3		19	25	55.4		9.5		47	13	37.9		9.5		2	21	31.0	
neb			31	44.8	B	8.3		3	47	33.4	B	9.2			45	29.4		7.8			27	51.9	A	8.7		3	54	51.0	B
9.0		45	1	35.0	B	9.2		8	30	58.8	B	8.0		22	16	42.6	A	6.0			28	1.7	A	9.5		9	54	16.3	
8.0			35	9.9	B	9.5			43	15.7		8.8		23	6	26.0	A	8.0			39	1.7	A	9.4		10	54	17.4	
9.5		46	3	39.4		9.4		13	30	34.4		7.0		25	29	17.6	A	8.3		50	18	57.5	A	8.5		11	58	52.8	
9.5		47	14	28.5		8.5		17	45	22.0	A	9.3		27	11	20.1		9.4			24	1.2		9.0		12	54	19.8	
9.5		48	18	19.7		8.2		18	49	14.2	A	9.3		28	10	46.1		8.6		51	55	12.9	A	8.6		13	14	54.3	B
9.5		49	42	4.0		9.5		20	21	41.7	A	7.3		29	41	48.8	A	9.5		53	36	25.7		6.5			50	27.6	F
7.7			46	24.6	B	9.4		21	29	42.2	A	9.5		32	21	19.6		9.5		57	12	12.3		9.3		14	47	43.3	
7.7		50	38	43.2	A	8.9		22	32	25.5		8.0		34	14	35.3	J	8.8			13	0.2		9.4		15	21	50.3	
7.8		51	15	29.0	A	9.0		23	43	31.0	A	9.1		35	3	27.0	A	8.7			31	24.1	A	8.5			33	20.4	B
9.1			33	12.8		8.8			52	49.0	A	9.0			3	18.6	A	6.3		58	40	23.1	A	6.9		16	45	40.8	B
9.5		53	5	12.3		9.3			56	38.0	B	9.4			53	42.6		9.2	14	1	3	54.4	B	9.5		19	12	57.5	
9.1		54	43	21.8	B	9.0		24	27	45.1	A	9.4		38	3	45.1	B	9.5			6	21	10.8		8.7		21	19	14.9	A
9.3		55	47	15.8	B	9.4		25	12	2.9	A	9.0		48	54	3.4		6.5			7	15	33.0	A	9.4		22	30	30.5	A
9.4		56	35	8.9		9.3		30	10	0.0		7.5		51	14	23.0	G	9.5			9	45	33.0		8.7		23	45	52.2	A
8.8		57	10	8.8	B	8.0		31	1	38.8	A	9.1			35	48.2	B	9.3			11	27	51.5		9.2		27	19	45.3	
9.2			19	23.5	A	8.5			56	1.5	A	9.5		52	10	42.5		8.8			12	52	27.2		8.6		29	59	38.6	B
9.3			57	12.8	A	8.5		32	13	49.1	A	7.2			47	29.2	B	9.3			14	44	20.3		9.5		30	31	11.4	

801—860						861—920						921—980						981—1040						1041—1100					
	15ʰ—16ʰ			+69°			16ʰ—17ʰ			+69°			17ʰ—18ʰ			+69°			18ʰ—19ʰ			+69°			19ʰ—20ʰ			+69°	
m	h	′	″	′		m	h	′	″	′		m	h	′	″	′		m	h	′	″	′		m	h	′	″	′	
7.6	15	31	5	38.7	B	9.4	16	39	9	19.8	B	9.5	17	31	11	55.9		9.3	18	25	10	26.3	A	9.3	19	18	46	12.8	
9.5		34	3	35.5		9.0			31	56.6	A	9.5			23	38.1		8.6			55	57.1	A	9.5			20	11	18.2	
9.5		36	29	1.7	A	9.3			47	19.7	B	8.6			57	25.4	A	8.5		26	42	51.6	A	9.0			21	5	37.9	
9.2			30	6.5	A	9.1		41	0	29.6	A	9.2		32	25	18.7	B	9.0		27	44	38.0	A	9.0			22	18	56.0	
8.5			56	47.4	A	9.5		42	25	35.6		6.5			32	41.2	A	8.5		29	23	3.7	A	9.0			23	35	38.9	
6.0		37	19	45.3	A	9.3		46	2	22.8		9.3		33	11	28.8	A	9.5			41	54.2		9.5			24	31	24.9	
9.2			38	21.3	A	9.2			13	31.9		9.5		34	40	24.9		9.1		33	4	48.7		9.2			25	8	31.1	
8.0		38	13	17.2	A	8.5			41	53.3	B	9.3			56	53.1	B	8.2			46	50.7	A	9.0			26	8	46.2	
9.5		39	23	20.2		8.9			56	57.8		8.7		36	35	43.1	B	9.4			53	35.6		9.5				44	38.3	
9.5		40	40	2.6		8.6		47	12	35.9	F	8.0			40	22.2	A	9.1		34	15	21.8	B	9.4			27	4	57.5	
9.0		43	45	21.5	J	9.5			18	7.9	B	9.2			47	40.5	B	9.4			24	52.6	B	9.0			28	54	24.7	B
7.0		44	19	7.1	G	7.5		48	4	19.3	A	9.5		37	8	52.9		9.3			36	22.1		8.2			31	36	14.3	F
7.1		46	52	55.2	B	9.0			5	6.2	A	6.5			59	39.1	A	9.5		35	7	55.5	B	5.0			32	38	24.6	A
9.5		47	47	32.6	B	9.5			37	17.0		9.5		38	39	27.4		9.0		38	2	58.8	A	9.5			33	25	31.4	
9.4			51	39.3		9.4			54	54.7		9.4			46	19.0		9.3		39	34	8.6	B	9.1				51	47.4	B
8.8		49	0	26.2		9.5		49	42	56.4		9.2		39	34	0.3	A	9.5		41	4	6.7		8.5			34	43	28.0	A
8.8			8	31.5		8.3			56	9.7	A	9.5			51	27.3		9.0		42	10	24.3	A	8.2			35	3	56.2	B
9.0		50	25	6.9	A	8.9		54	49	3.3	A	8.7		40	0	16.0	A	8.8			47	21.8	A	8.0				54	28.4	A
9.5			50	15.3	A	8.7		55	19	55.6	A	7.0		41	19	12.1	A	7.5		44	10	11.0	A	9.3			36	58	56.6	A
9.0		52	21	9.9	A	9.2		57	0	14.2	A	9.5		42	6	17.4		8.9			23	46.6	A	8.8			37	33	24.1	A
9.3			30	54.4	B	8.5		59	0	10.9	A	9.2			39	52.1		9.5		45	58	11.0		9.0			38	17	7.5	
8.5			41	58.7	A	9.3			21	47.5	A	8.5		43	30	11.9	A	9.3		47	2	8.4	B	9.0			40	43	48.2	A
8.7			41	25.2	A	8.2			43	50.0	A	9.5			58	29.7		9.2		49	7	14.5	A	9.5				45	43.7	
9.5			50	10.7	A	6.5			55	24.1	A	9.5		44	7	59.6		9.3		50	49	56.4		9.5			41	16	19.7	
6.8		53	20	8.0	A	9.0	17	1	49	51.6	A	9.5			28	33.6		9.3		51	20	36.2		8.0				25	34.9	F
8.8		54	24	53.2	A	9.3		2	0	55.3		7.7		45	0	8.1	A	9.1		52	5	42.5		9.4				43	52.0	
9.5			35	57.6		9.3			1	40.5	A	8.5		48	30	47.8	A	9.5		53	33	42.2		8.3			43	36	9.0	A
9.5		55	14	39.5		9.5			34	12.9	A	9.1		49	32	8.6	A	9.5			51	40.9	B	9.1			45	26	21.5	
9.5			47	2.2		9.4			46	57.2		9.3		50	43	44.2	B	8.5		54	8	38.0	A	8.0			46	25	33.9	A
9.5		59	13	0.2		8.7		3	42	39.0	A	9.4		51	12	40.2		9.4			54	9.1	B	3.8			48	39	53.2	A
8.5			35	37.6	A	7.7		4	49	58.8	F	8.5			21	13.2	A	9.5		55	37	33.1		9.1			49	4	25.5	
8.7			57	37.1	A	9.2		7	22	18.2		9.2		52	1	16.5		9.4		56	39	7.6		9.5			50	24	14.1	
9.3	16	5	30	23.7	B	9.1		8	22	37.2		9.5			45	29.7		9.5		57	0	57.0		9.4			51	33	12.6	B
9.0		6	47	18.9		9.0		9	53	36.2		9.0		55	33	3.7	A	9.5			15	39.5		9.5			52	35	27.5	
9.5		7	21	58.9	A	7.8			56	16.8	B	9.5			38	14.7		8.7		58	19	24.8	A	9.5			53	5	46.7	
9.3		9	45	29.1	A	9.5		10	30	51.3		8.6		56	0	15.9	A	9.3		59	12	17.0	B	9.4			54	24	50.7	
9.4		12	24	49.3	A	9.5			49	3.2		9.2			8	20.7		9.5			43	33.2		9.5				36	49.1	
9.0			49	15.9	A	8.7		12	24	39.6	S	6.7			31	37.9	A	6.3			47	18.7	A	9.5			55	9	12.8	
9.3		13	23	37.1		8.7			40	30.2	A	9.5		57	27	37.3		9.2	19	2	22	5.8	B	9.5				15	14.3	
9.5			39	40.9		8.1		13	30	28.7	A	9.5			30	19.0		9.5			30	39.3		9.5			56	22	10.7	
9.1		17	2	8.7	B	9.0		14	27	48.9	A	9.0		59	43	35.3		9.4			55	8.6	B	8.9				38	43.2	
9.5			38	15.5		9.5		15	38	22.5		9.1	18	0	36	19.5	A	8.6		3	12	14.8	A	9.5			57	40	37.8	
9.5		21	41	17.5		9.5			52	37.1		9.4		1	35	14.6	A	8.3			47	5.0	A	9.3			58	31	27.7	
9.3			47	19.4		9.1		18	36	27.4		9.2		2	43	52.6	A	9.5		4	7	6.9		6.5			59	5	57.6	F
5.5		22	11	27.2	G	8.7		19	38	5.1	B	9.0		4	12	38.3	A	9.4		5	33	48.6		8.3				27	58.9	F
9.0		24	32	2.6	A	7.9			48	1.1	A	9.5		5	43	24.0		9.2		6	20	16.3		7.8				41	0.4	
8.8			30	53.3	B	9.5			57	59.8		8.8		9	18	45.1		9.3		7	40	8.4		9.4	20	0	6	56.5	
9.5		25	30	7.2		9.0		20	11	21.9	A	8.9		11	19	38.2		9.4		8	26	14.8		8.5			1	8	32.4	
9.5		27	28	13.9	A	9.0			44	21.9	A	9.0			42	48.0		8.8		9	16	32.1	A	9.5				33	0.6	
5.2		28	17	5.2	A	7.0		21	18	53.9	A	8.2		12	22	12.7	S	9.1			19	56.0		8.2				50	28.2	B
8.5		29	48	15.4	A	7.2		22	27	56.6	A	9.0		13	20	19.1	L	9.4		10	9	27.8		9.5			2	39	27.5	
9.5		32	22	27.1		9.5		23	5	40.5		9.1			28	40.1	A	9.2			23	17.5	B	9.2			4	46	0.5	B
8.8			46	47.8	A	8.7		24	47	55.2	A	8.0		17	55	38.9	A	9.3		11	6	59.6		9.5			11	2	26.1	
9.4			57	57.6	A	9.5			56	45.4		8.1		19	17	56.8	A	8.0			56	10.3	F	9.5			12	42	48.5	
9.3		33	54	16.5		9.5			57	34.7		9.4		20	16	43.5		8.5		12	4	37.8	F	9.5			14	31	22.6	
9.4		34	15	21.2		8.5		25	35	6.8	A	9.1		21	53	58.1	A	8.1			53	27.1	F	8.8			15	17	37.4	
9.5			57	17.0		9.4			38	17.5		7.9		22	14	58.8	A	9.2		13	1	12.3		9.2			20	30	13.2	
9.5		35	29	36.1		9.3		26	20	7.9	A	9.5			38	33.8		8.8		15	24	25.1		9.1			21	24	48.5	
9.0		38	16	36.6	A	9.3			36	5.4	A	9.3			56	58.1		9.2		16	24	7.5		7.7				45	2.7	B
7.7			36	26.7	A	9.5		27	59	45.5		9.4		24	15	29.7	B	9.0		17	38	32.9		8.6				53	40.6	

1101—1157								1158—1214								1215—1271								1272—1327								1328—1383							
	20ᵘ—21ᵘ			+69°					21ᵘ			+69°					22ᵘ			+69°					22ᵘ—23ᵘ			+69°					23ᵘ			+69°			
m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′			
9.0	20	22	9	38.2				9.5	21	14	21	15.8		B		9.0	22	0	34	33.1		A		9.3	22	33	13	59.6				8.5	23	17	58	14.6			
9.2			36	59.2		B		9.5			49	38.5				8.3		1	14	30.1		A		9.5		35	51	31.6				9.0		18	59	10.2			
9.5		24	6	29.3				8.3		17	48	15.9				9.3		2	24	41.4				9.5		36	49	12.5				9.5		19	31	2.4			
9.5			33	52.6				9.4		18	59	6.6		B		9.5		3	17	38.1				9.5		37	5	37.6				6.8		20	11	53.3		A	
9.5		26	35	27.5				8.3		19	32	6.6		A		8.0			45	31.1		A		9.5			32	22.3				6.2		21	6	34.3		A	
9.5		28	22	40.3				9.1		20	29	32.0				9.3			46	54.6				9.5		39	25	18.8				8.9		25	9	46.1		A	
9.1			25	46.8		B		9.1			34	22.2				6.8		4	8	59.1		B		8.7		41	1	51.2				9.5		26	40	44.6			
9.0			33	57.9				9.4		21	51	47.7				9.3			19	57.1				9.5		42	2	30.6				9.3			42	36.3		A	
9.4		29	8	13.3				7.5		22	27	23.2		A		9.5			29	7.2				9.5		43	7	36.6				9.3			54	18.1			
8.3		31	44	57.6		A		9.1			31	16.0		B		8.2			55	14.7		A		8.5		45	25	10.0				8.4		27	8	34.3		A	
9.5		32	1	4.9				7.7			51	10.2		A		8.2		5	0	16.2		A		9.5			48	34.1				9.3		29	33	31.3			
7.8			44	9.7		A		7.4		23	30	50.8		A		8.2			39	31.6		A		9.3		46	33	25.4		B		9.5		30	56	58.8			
9.3		33	38	26.0				9.5			31	20.2				9.2			43	27.8				9.5			46	42.4				9.5		31	36	51.3			
7.0		34	43	9.7		A		9.5		24	48	0.1				5.9		7	21	24.6		A		9.5		47	39	18.0				9.4			38	41.7			
9.5			44	48.5				8.8		25	14	43.4		A		7.9		8	8	39.9		B		9.4		48	52	12.0				8.2			57	49.5		B	
9.0			47	59.9		A		3.0		26	48	55.7		S		8.7			59	10.5		B		9.4		50	0	52.4				9.5		32	5	51.3			
9.4		36	15	15.3				9.5		28	10	12.0				8.8		10	1	31.7				7.0			29	31.1		F		8.9			25	41.2		B	
9.4		38	17	40.6				9.3			14	42.4				8.0			8	25.3		B		9.5		52	41	30.6				8.0		33	14	58.8		A	
9.4		40	5	19.0				9.5			48	40.4				8.5			17	19.0				9.5		53	12	24.3				9.5			29	11.4			
8.7			23	23.5		J		9.1		29	2	2.8		B		8.0			30	10.6		F		9.0			37	5.2				9.3			44	38.8			
9.4		42	3	59.2				8.7			41	0.5		A		9.5		11	18	59.5				8.6		54	4	59.1		F		9.1		34	9	35.1		A	
8.5			26	8.7				9.2			44	58.5				7.8			23	15.6		F		9.3			51	29.4		B		9.3			12	31.7			
9.5			40	44.6				9.3			45	57.1				8.0		13	17	11.1		F		8.3		55	22	1.2		A		9.4			22	16.3			
9.5			47	36.8				9.0			50	33.6		A		7.3			59	19.9		F		9.3		56	2	57.0		B		9.3			22	21.0		B	
9.5		43	2	5.3				9.5		30	2	18.7				9.2		14	38	7.8				9.3			4	49.8				9.5			31	53.8			
9.5			10	9.0		B		9.5		31	16	19.8				9.1		15	18	42.0				8.8		57	1	27.8				8.6			39	35.4		A	
6.7			38	13.3		G		9.4			26	31.1				9.0			22	11.6				9.2			2	3.7				9.4		36	48	30.1			
9.0		44	32	28.5		B		9.5		33	13	20.4				9.5		16	37	54.2		R		9.5			32	48.4				9.0		37	14	30.1		A	
7.5		45	43	24.4		A		9.5			32	46.4				9.5		17	17	10.2				9.0			48	37.5				9.1			16	18.0		A	
7.0		47	26	6.9		A		9.4		34	50	46.4				9.5			44	49.0				9.2		58	30	24.8				9.3			38	20.2		A	
9.5			37	58.1				9.4		36	19	7.1				7.8		18	3	32.2		A		9.3			39	21.8				9.5		38	25	37.1			
9.5		48	5	43.1				7.7			45	18.4		A		9.5			19	28.4				7.6		59	8	50.8		A		9.5		39	25	18.5			
9.5			25	44.1				8.0		38	38	51.9		R		9.5			55	38.2				9.2			53	50.3				9.2			32	11.0			
8.7		49	53	4.8		A		8.1			52	1.7		A		9.4		19	20	7.8				9.4	23	0	54	21.3				9.3			33	7.8			
9.5		51	59	48.4				9.5		41	5	26.5				9.3		21	52	22.7		B		9.4		1	26	58.4				9.2		40	1	34.6			
7.5		53	17	24.4		G		8.3		42	20	18.8		A		8.0			54	9.2		G		7.6		2	7	53.7		S		9.5			53	35.6			
9.3			37	8.6				9.2			22	0.2				9.5		24	39	6.4				8.5		3	23	19.4				9.3		44	0	34.1			
9.1		54	20	28.6		F		8.3		43	21	40.4		A		9.0			41	14.6				9.5			34	47.8				9.5		45	2	51.2			
9.0		56	26	52.6		B		9.4		44	11	24.8				8.3		25	11	53.9		A		8.6			56	24.3				9.0			7	27.8			
9.5		59	43	27.5				9.0			21	18.9		A		9.2			14	38.2		B		8.5			57	28.7				9.5			18	34.1			
9.4	21	0	47	30.4				6.7			27	28.7		A		9.4			16	2.6		B		9.5		4	41	38.5				9.0		46	31	43.4			
9.3		1	20	30.8				9.0		45	29	52.4				7.0			33	41.5		A		9.5		6	4	48.4				8.6		47	59	56.2		A	
9.3			44	9.2				9.2			53	29.6				7.3		26	2	25.8		A		9.5			26	20.3				8.5		48	30	52.5		A	
9.5			47	59.4				9.0		47	38	41.4				9.5			27	4.3				9.5			58	58.6				8.8			33	40.9		A	
9.5		2	27	29.9				9.0			39	33.1				9.5		27	0	15.6				9.4		7	8	49.3				8.7		50	42	24.8		A	
9.5		4	38	47.4		B		9.5		49	13	21.2				9.5			25	42.0				9.2			29	57.2		A		8.0		51	1	45.7		A	
9.5		5	7	23.0				7.2		50	17	0.2		J		9.3		28	29	51.9				9.0		9	13	59.4		A		9.5		53	0	14.0			
8.0			22	5.8		A		9.0		51	54	29.1		B		6.0			52	8.7		A		9.1			56	2.2				9.3		54	0	57.5			
9.2		6	34	25.7				9.3		52	6	25.1				6.2		29	12	37.2		A		9.4			58	25.4				9.3		55	31	26.0			
9.5		7	56	58.9				9.1			16	5.6				8.2			13	20.0		A		9.0			59	35.6		B		8.0		56	13	29.6		G	
6.8		10	15	50.6		A		9.5		53	8	25.3				9.5			44	40.2				9.5		10	57	39.6				7.7		57	15	40.4		G	
6.5		12	11	26.7		P		9.5			34	9.1				9.5		30	27	4.3				9.5		11	4	54.6				8.5			28	59.1		F	
9.5			58	47.6				9.5		54	30	18.5				9.2			58	42.9		G		9.5		12	12	23.4				[illegible]		[illegible]	[illegible]	4.7			
9.4		13	4	57.5				9.5			31	11.5				9.5		31	10	32.0				9.5			55	46.1											
9.0			14	35.6				7.5		57	10	38.9		R		7.5			27	29.2		A		8.8			56	37.7		A									
9.5			26	15.0				8.9			31	25.7				9.4			34	21.2		A		9.5		13	38	28.4											
9.4		14	19	40.0				9.3		58	6	19.4		B		9.2		32	43	15.4		A																	

Zone +70°

1—40				41—80				81—120				121—160				161—200			
	0ᵘ		+70°		0ᵘ		+70°		0ᵘ—1ᵘ		+70°		1ᵘ		+70°		1ᵘ—2ᵘ		+70°
m	u	′ ″	′		m	u	′ ″	′	m	u	′ ″	′	m	u	′ ″	′	m	u	′ ″	′	
8.4	0	0 32	20.7	A	9.5	0	34 18	51.5	9.4	0	59 41	8.1	A	9.1	1	29 46	38.5	8.9	1	54 32	28.7	A
9.4		4 13	9.0		9.5		35 1	44.7	9.2	1	0 59	12.1	A	9.5		51	28.7	9.2		56 27	41.9	A
9.5		5 25	42.9		7.8		8	2.3	A	9.2		1 23	52.4	9.3		32 4	18.9	7.2		42	51.6	A
9.5		7 6	37.8		9.5		59	49.5		9.5		2 13	40.7	8.6		33 1	10.5	A	9.0		50	31.5	
9.0		11 13	37.8		9.0		36 13	12.8		9.5		59	51.5	9.5		25	57.1		9.1		59 40	47.7	A
9.3		18	47.4	B	9.5		37 19	18.1		9.4		4 29	9.7	9.5		38	40.9		9.2	2	0 50	35.9	B
9.5		51	2.3		9.5		40	14.2		7.8		30	19.0	A	8.5		50	18.9	A	8.9		4 38	30.6	A
9.3		12 2	5.9	A	9.3		48	2.7		8.2		5 35	19.5	A	9.0		34 27	57.6	A	9.5		43	35.9	
9.5		46	5.0		9.0		39 57	17.7		8.0		42	48.4	A	9.5		32	16.8		8.5		10 4	30.5	A
8.0		13 46	25.7	F	9.5		40 5	57.8		6.0		53	59.7	A	9.5		50	10.0		9.5		10	54.5	
9.5		58	59.0		9.5		32	8.3		9.4		6 22	46.6		9.5		53	49.8		9.3		11 4	15.3	
7.3		14 0	41.4	G	8.9		34	38.5		9.3		7 41	58.7	B	9.4		35 47	26.7		9.4		12 55	29.0	
9.5		15 29	29.0		7.3		41	23.1	B	9.5		42	11.2		8.5		37 22	50.8	A	9.2		14 43	36.9	
9.2		56	56.0	A	9.1		43	46.6		9.5		8 50	25.9		9.5		39	58.1		9.4		52	46.2	
9.5		17 29	33.3		9.0		41 3	39.3	B	9.5		11 35	23.4		9.4		39 5	48.7	B	9.5		15 9	5.5	
9.5		32	39.8		9.5		42 30	27.1		9.5		12 23	48.4		9.1		40 3	29.2		8.7		16 24	18.1	F
9.3		42	49.1		7.3		55	51.0	A	9.5		32	12.6	A	7.2		45	1.5	A	8.5		33	1.8	F
9.5		18 22	32.2		9.5		45 19	6.6		9.4		13 21	13.1		9.5		41 6	47.2		9.4		17 41	27.5	
9.5		19 3	35.9		9.5		47 9	56.0		9.5		21	9.2		9.5		16	47.2		9.4		19 12	14.2	
9.5		20 9	16.8		9.3		36	48.5		9.4		31	33.2	B	9.5		34	48.9		9.4		17	0.2	
9.4		19	4.0		8.8		48 9	37.8		8.3		14 5	48.5	A	9.5		42 4	44.3		8.4		20	57.9	A
8.8		22 47	19.1	A	8.8		25	20.0		6.1		15 11	13.4	B	9.5		10	43.9		8.0		20 32	17.8	A
8.9		57	34.4	A	9.0		49 52	9.2	A	9.5		23	26.0		9.2		43 31	54.7		6.5		53	39.8	A
6.2		24 46	9.8	A	9.4		50 8	12.9	B	9.0		18 17	20.9		9.0		45 30	21.9		9.0		21 5	0.5	
9.5		27 35	38.7		6.5		51	12.7	A	8.4		38	9.5	A	9.0		41	4.1	A	9.5		30	31.4	
9.5		28 15	7.4		9.1		56	56.0	A	9.5		19 17	8.3		8.8		46 13	7.8	A	8.5		30	52.5	A
8.5		29 29	22.5	A	9.2		51 9	36.9	A	8.5		51	57.6		9.1		32	48.2	A	9.0		38	52.7	B
8.7		46	23.5	A	9.5		52	56.0		8.5		20 15	22.2	A	9.5		49	20.3		9.5		22 9	54.9	
9.5		30 26	49.5		9.4		53 0	21.1		9.1		18	8.5		8.9		54	3.0	A	8.2		13	0.5	A
9.3		26	9.3	A	8.3		3	14.7	A	8.8		21 26	31.6	A	9.4		47 39	1.0	R	8.0		44	17.3	A
9.4		46	7.9	A	9.5		39	44.7		9.5		22 22	31.1		9.4		48 46	15.4		9.0		53	6.5	A
9.3		52	15.7	A	9.0		58	38.2	A	8.0		25	47.9	A	9.3		53	29.5	B	9.0		55	8.3	A
9.4		31 12	27.9		9.2		56 17	25.0	A	9.5		23 48	49.1		4.6		50 8	10.7	A	9.5		24 22	40.3	
9.5		28	19.6	A	9.5		28	19.6		9.5		25 17	16.5		9.5		14	57.9		8.3		25 19	15.5	A
9.5		29	13.7		9.4		30	11.7	B	9.5		25	45.9		7.5		41	35.6	A	8.6		26 20	19.8	B
9.4		32 14	36.4		9.5		41	6.9		9.5		26 3	58.6		9.3		48	37.8	A	9.0		27	19.3	A
9.5		33 20	1.0		9.5		45	7.7		9.2		17	36.5		7.3		52 20	30.2	A	8.0		41	35.7	A
9.5		21	29.3		6.7		57 0	9.3	A	9.3		27 52	25.8		9.5		30	37.5		7.0		28 30	58.9	A
7.0		41	34.6	A	9.5		47	27.4		9.2		28 6	29.2		8.9		53 4	46.8		8.0		29 7	57.4	A
9.5		55	27.7		9.0		58 39	30.4		9.5		29 20	31.6		8.8		54 13	9.4	A	9.3		29	5.3	

201—260					261—320					321—380					381—440					441—500				
	2ᵘ—3ᵘ			+70°		3ᵘ—4ᵘ			+70°		4ᵘ—5ᵘ			+70°		5ᵘ—6ᵘ			+70°		6ᵘ—7ᵘ			+70°
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
9.2	2	31	16	8.6	B	9.1	3	36	35	55.0	A	8.5	4	33	30	11.4	A	9.2	5	41	42	40.1	A	7.8	6	59	34	44.8	L
8.9			30	15.0	B	7.4			49	3.5	A	6.3		34	25	40.4	A	9.3		44	25	55.7		9.5	7	0	19	18.4	
9.5		32	53	13.8		9.3			50	2.7	B	9.4			29	3.6		9.0		46	32	36.6	A	9.5			56	0.4	
9.4		33	19	39.8		9.5			54	48.3		9.3		36	31	16.1	A	9.4		49	41	51.7		9.3		2	15	11.0	
9.0		35	30	25.7	A	9.0		39	28	44.3	A	9.0		38	24	38.2		9.5			48	21.9		9.2			29	31.9	B
9.3			56	21.0	A	9.4			52	4.6		9.0			36	12.1	B	9.3		50	10	53.2		9.0		6	11	35.1	
9.5		36	20	41.2		9.0		40	55	50.6		8.5		39	4	23.8	A	9.5		51	45	12.5		8.6			28	17.9	A
8.6		37	7	21.5	A	8.3		44	52	1.6	G	9.1		40	17	13.1	B	9.5		52	15	54.7		8.5		7	8	15.9	A
9.4		38	5	34.8		9.0		46	13	46.5	B	8.8			40	55.3		9.5		53	48	35.1		7.1		8	23	57.1	A
9.4			17	57.2	B	9.0		48	48	20.2	A	8.6		41	14	25.3	A	8.3		54	14	15.4	A	8.2			30	12.8	B
8.6			33	58.4	A	9.0		49	34	42.1	B	9.5		42	37	29.8		9.3		55	7	16.0	A	9.3			59	48.2	
9.5		42	45	50.0		9.3			39	41.5		9.3		43	23	1.4	B	9.5		58	21	37.6		9.3		9	43	23.2	
9.5		43	14	29.0		9.0		51	17	46.2	A	8.3		44	0	11.6	J	7.8			22	41.5	B	9.1		11	3	40.5	
9.4		44	1	7.3		8.4			36	3.2	A	9.5		46	47	21.5		7.7		59	13	0.8	B	9.5		13	2	59.6	
9.0			1	45.6		9.5		52	42	39.9		8.8		47	8	36.2		7.0			21	49.5	B	9.1		14	5	13.4	
8.3			41	1.7	G	7.5		53	25	56.6	A	9.3		48	54	41.6	B	9.5			30	21.0	B	9.3			7	38.1	
9.0		46	45	13.1	A	9.0			46	29.1		9.5		50	25	1.2		9.3	6	0	15	27.3		9.5			28	17.8	
9.4		47	53	27.0		9.3		55	25	59.0		9.4		51	48	8.3		9.5			22	14.5		9.5		16	12	40.5	
8.1		50	3	4.7	A	9.3			32	56.1		8.4		52	24	20.5	B	9.1		8	48	7.3	A	8.9			26	23.2	A
8.2		52	0	26.6	F	9.5			42	30.5		8.3		56	31	46.0	A	9.4		9	43	9.6	A	9.3		17	2	42.4	A
9.3			4	1.4	A	7.0		59	2	50.1	A	9.2		58	14	13.5		6.0		11	41	37.9	J	9.4			55	22.0	B
9.4			9	59.8		8.4	4	0	16	41.7	A	9.5	5	0	10	12.2		8.7		13	44	0.4	B	8.9		18	25	45.6	A
9.4			20	52.3	B	9.5			55	30.5		9.4			12	22.9		9.5		15	21	48.6		9.4		19	27	20.7	
8.9			34	10.5	A	9.3		1	15	26.1		9.5		1	18	39.7		9.5		17	26	17.7		9.5		20	17	40.4	
8.3			38	56.9	A	8.5			29	17.3	A	9.3		3	33	41.7		9.2		18	29	46.7	A	9.5			32	42.8	
9.2		54	11	52.5	B	7.3			40	4.7	A	9.2			48	40.7	B	7.2		20	24	36.4	A	9.5			58	36.5	
8.5		55	8	57.9	A	9.5			53	38.9	B	9.4		5	3	19.1	A	9.4			44	46.2	A	8.9		24	40	19.8	A
9.5			13	23.5		9.0		4	16	22.1		8.8			43	9.7	A	9.3		22	29	59.4		8.7			48	36.5	A
9.0		56	45	13.1		9.4		5	30	1.5	B	9.5		6	56	6.0		9.0		25	29	19.7		8.9		25	43	35.4	A
7.2		58	19	59.8	A	9.4			36	41.1	B	9.5		7	16	28.3		8.2			57	42.6	B	9.5		26	50	11.8	
7.9			45	40.2		8.7			55	56.8	B	6.7		10	34	6.1	A	9.5		26	12	16.7		7.8		27	40	1.2	A
9.5		59	34	17.7		8.8		6	14	8.9		9.0		11	19	48.0		9.5			45	1.1		9.5		30	25	5.0	
8.6	3	1	10	0.1	B	8.5			54	40.8		8.8		12	36	14.1		9.3			48	42.4	B	9.3			47	50.6	
9.0			59	51.0		7.8		7	11	29.1	F	9.5		15	14	11.6		9.3		28	26	48.5		6.8		31	56	33.0	A
8.4		3	37	22.1		9.4			46	47.3		8.0			41	41.1	A	9.0			40	56.4		9.1		32	16	40.4	A
9.4		6	41	15.2	A	9.4		9	23	57.7	B	9.0		17	46	22.0	A	9.1		29	24	49.7	B	9.4			22	53.4	A
9.5			57	3.3		8.6			51	56.7	A	8.6			55	2.9	A	8.5			34	52.9	B	9.5		33	45	25.6	
9.5		7	4	6.3		9.2		10	43	35.9		9.4		18	38	33.9		8.9		30	21	39.8		9.5		34	38	59.9	
7.9			44	34.8	A	9.3		14	16	11.0		9.5			38	20.7		7.9		31	16	22.1	A	9.5		35	19	6.1	
9.5		8	18	5.8	B	8.0		15	33	0.1	G	8.4		20	8	56.8	A	9.5		34	8	51.2	A	9.0		36	35	47.3	A
7.5			28	45.1	A	8.9			57	7.7	B	9.4		21	50	50.2		9.5		35	42	14.0	A	9.5		37	43	32.0	
8.0			59	52.9	A	7.8		16	15	15.8	A	7.0		22	21	16.4	A	9.2		36	17	23.7	A	9.4		39	18	41.8	
9.5		13	20	50.5		8.9		17	45	8.9	A	9.1			24	39.1		9.5			36	56.7		9.4			41	49.2	
9.5		16	15	59.3		9.0			48	37.5		8.7		26	15	23.8		9.5		37	21	29.7		9.5		41	11	42.2	
9.0			34	0.7		7.8		19	0	2.0	G	9.1			33	44.4		9.0		40	39	12.1	A	9.5		42	38	16.1	
9.3		17	36	59.3		8.5			53	24.6	A	9.3		27	36	20.8		9.0			42	29.7		9.3		44	16	43.2	
9.4		21	27	53.4		9.3		21	27	29.8		9.0		29	49	38.6	A	8.0		41	11	16.4	A	9.1			19	40.6	
9.5			50	8.6		9.4			31	25.4		8.0		30	46	44.9	A	9.5		42	37	8.1		9.5		45	5	3.9	
9.5		22	10	17.8	B	9.5		22	54	59.1		9.4			54	16.0		8.8		44	23	33.0		9.5			40	53.0	
9.4		24	42	43.2		8.6		25	11	39.0	B	9.1		31	9	10.5	A	6.0			53	59.6	G	9.1			49	29.9	B
9.1		25	41	29.6		9.1			52	39.9		8.8			22	28.7	A	8.9		48	47	50.3	A	9.4		46	31	26.0	
9.3		28	47	36.0		9.5		26	14	53.8		9.5		32	58	58.2		6.5		49	28	57.1	A	8.9		47	25	14.6	A
9.1		30	51	8.2		9.0		27	11	53.8		9.5		34	48	23.3		9.4		50	18	37.5	A	[illegible]			[illegible]	51.2	B
8.7		32	55	5.2	A	9.5		29	1	42.4		9.5		37	45	27.3		9.2		51	3	12.0	A					6.4	
8.5		33	10	24.3	A	9.2		30	9	10.0	B	9.5		38	0	59.2		9.4		53	21	34.1						7	
9.0			53	17.8		9.1		31	11	57.3	A	9.5			14	21.4	A	9.2			58	48.8	A					2	G
5.7		34	14	25.3	A	9.0		32	8	56.7	A	9.5		39	21	13.0		9.5		54	21	3.6							G
9.1			41	42.3	A	9.3			27	30.8		9.5			35	40.5		9.5		55	34	25.7							
4.3		35	5	52.1	A	9.4			41	44.5		9.4			55	50.9		9.5		56	43	35.8							
8.5			28	52.3	A	8.2			45	14.9	A	9.5		41	42	36.1		9.3		58	20	30.[illegible]							

501—560					561—620					621—680					681—740					741—800				
	7u—9u		+70°			9u—10u		+70°			10u—11u		+70°			11u—13u		+70°			13u—14u		+70°	
m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′	
9.5	7 59	11	7.5		7.5	9 12	50	58.5	A	9.4	10 31	43	14.1	B	8.6	11 51	45	39.4	A	7.3	13 23	57	52.3	A
7.0	8 2	29	37.7	A	9.5	13	33	19.3		8.3	32	17	16.0	A	9.5	54	27	57.6		9.5	24	34	36.7	A
9.2		36	7.4	A	9.0	15	57	0.4	A	8.8	34	1	41.6	A	9.5	55	5	22.8		8.9	26	42	0.8	A
8.6	3	27	52.9	A	8.5	19	37	21.3	A	9.5	37	21	44.6		9.5	58	20	38.9		9.4	29	1	16.5	B
8.8	4	51	39.7		5.2	21	38	28.6	A	8.2	38	3	36.1	A	8.8	12 1	23	24.2	A	9.5		4	11.8	
9.4	6	38	14.1		9.0	23	58	49.0		9.5		51	4.0		8.3		59	47.3	A	8.8	30	47	48.0	F
9.5	7	55	53.5		7.5		58	16.6	A	8.5	39	0	58.1	A	9.5	3	18	18.7		7.0	31	11	51.4	F
8.8	8	54	7.4		7.0	25	21	54.8	A	9.5		36	54.6	B	9.5		19	58.5		7.8	32	53	30.4	S
9.5	9	35	31.9		9.1		45	3.4	A	9.5		49	15.5		9.5	5	49	59.0		9.5	34	28	24.9	
7.3	11	30	35.4	B	8.8	27	11	56.8		8.7	40	4	22.5	A	8.0	9	49	57.1	A	9.0		50	5.8	A
9.5		38	23.5		9.0		57	15.6		9.4		52	50.9		8.0	10	32	30.1	A	9.4	35	13	31.8	
9.5	13	19	38.9		9.5	28	21	55.8		9.3	41	53	49.4		9.5		38	3.3		9.5		19	51.9	
9.5		40	3.2		9.3	31	4	20.5		8.4		55	30.3	A	8.8	11	21	55.1	A	8.3	36	44	34.8	A
9.5	14	10	25.4		9.5		39	53.8		6.0	43	33	36.6	A	9.4	15	42	51.2		9.1		44	55.0	B
9.3		49	44.6	A	7.8		57	56.3	A	9.0		55	39.6	A	8.7	16	50	27.2	B	8.9		58	20.5	A
8.8	17	6	23.5	A	9.5	32	18	1.0		9.5	45	0	34.8		9.3	18	1	26.6		9.3	37	44	57.6	B
9.3	20	1	51.9		9.5	35	18	41.6		8.5		37	31.8	A	9.0	19	29	29.6	A	9.4	38	37	42.6	A
8.8		6	27.3	A	9.5	36	25	26.8		8.0	46	50	47.5	A	8.3	20	24	32.1	A	9.4	45	20	5.8	
9.2		23	10.3		9.5		29	7.1		9.5	47	56	22.0	B	8.6	23	27	30.4	B	9.4		40	35.8	A
9.5		40	33.3		9.5		32	15.1		7.8	48	46	35.2	A	4.7		45	0.0	A	8.0	46	38	21.9	A
8.2	21	38	4.5	G	9.5	37	58	35.7		7.1	49	4	46.4	A	9.1	24	44	14.1		8.0	51	31	15.5	B
8.5	22	27	12.7	G	8.0	38	12	51.8	A	9.0		30	33.3	A	9.5	26	35	48.8	R	7.0	52	26	39.7	F
6.8		44	11.0	G	9.3	40	27	20.4		8.0	51	3	21.5	A	3.3	27	14	34.8	A	9.5		36	54.9	
9.2	23	25	45.9		8.1		59	33.1	A	8.9	53	29	1.3	A	9.1	28	21	21.7	A	9.4		56	40.2	
9.5	24	43	47.9		9.5	42	4	26.8		6.3		40	48.9	A	4.8		36	49.8	A	9.5	53	3	44.5	
9.5	26	22	4.8		9.4		16	8.2	A	8.9	56	18	18.5	A	9.5	29	22	47.3		9.3	58	9	22.9	A
9.5		38	3.5		9.5	43	12	21.5		8.6	58	5	19.9	A	6.8	30	48	58.7	A	9.5		14	43.5	B
6.8	28	33	40.1	A	8.2		24	43.5	A	9.3		30	24.4	A	9.0	31	45	30.9	A	9.2	59	6	14.1	A
9.5	30	33	59.2	A	9.5	44	44	46.0		9.2	11 0	37	57.2		9.2		52	31.7	B	7.3	14 0	36	58.8	A
9.4	31	17	27.3		9.5	45	5	30.8		9.5		58	17.0		9.4	32	47	20.6	A	8.0		49	43.3	B
9.4		28	24.5		9.5	47	13	53.8		8.4	1	6	41.0	B	8.3	37	17	44.4	B	8.0	3	59	19.5	A
9.5	32	38	6.4		9.1		28	50.4		9.5	2	22	8.6		9.5	40	33	4.1	B	9.5	4	56	51.4	
9.5	34	28	55.2		8.0	52	57	55.8	L	9.5	6	34	37.9		9.3	44	47	5.3	B	9.3	6	22	38.7	A
9.5		52	56.2		9.5	54	4	11.1		8.3	7	22	0.5	A	9.0	45	0	37.9	A	7.2		44	16.6	A
9.5	36	57	29.3		9.5		42	44.0		9.5	10	43	47.9		7.9		34	4.9	A	8.0	7	44	1.8	A
6.8	37	10	49.9	G	8.5	55	37	33.7	A	9.3	11	57	10.6	R	9.4	47	32	21.7	A	7.9	8	19	44.6	A
9.5	38	3	26.8		9.3	56	7	44.5	B	9.2	13	11	28.8	A	9.5	48	7	32.0	A	9.4		35	1.6	
8.5	41	22	40.1	A	7.5		11	38.2	A	9.5	15	57	26.8		8.7	49	42	43.3	A	5.3	9	24	6.8	A
9.5	45	46	35.1		9.4		45	46.0		8.4	16	41	27.8	A	8.9		46	35.9	A	9.5	12	52	44.4	
9.4		57	47.4		9.5	57	36	44.5		9.5	18	30	25.0		9.0	50	2	39.8	A	9.4	13	10	13.0	B
8.9	47	49	21.0	A	9.5	10 3	18	25.4		8.3	19	5	35.9	A	9.5	51	20	47.1	B	9.5	16	27	57.7	
9.0	48	52	46.9		9.5		52	19.6		9.5	21	8	36.6		9.0		24	18.7	A	9.1	18	49	18.9	
9.5	50	18	58.7		8.2	6	13	43.3	A	9.4		14	7.6	R	9.5	53	25	44.3		9.5	20	21	16.0	B
9.5		53	17.0		9.0	7	27	18.6		9.5	22	22	47.9	A	8.4	56	38	55.1	B	9.5	22	10	44.9	
9.5	51	26	44.0		9.2	8	0	26.2	B	3.3		46	8.6	S	8.7	59	0	17.2	A	9.4	23	56	36.1	
9.2	52	1	9.4		9.5		18	27.7		9.3		59	19.0		8.2		49	26.5	A	9.3	24	10	16.6	B
9.5		13	3.1		8.5		25	36.3	A	9.5	23	19	30.8		8.8	13 2	16	53.1	A	8.7		34	57.8	B
8.5	56	36	22.0	A	9.4		35	54.7		9.3	26	18	7.7		8.4	4	2	44.5	B	9.5		57	7.2	
9.1		40	26.8	A	9.5	10	11	26.5		7.3	27	6	23.2	F	9.5	6	18	23.3	B	8.9	25	4	8.9	
9.4	58	4	35.6		9.5	12	48	17.1		5.2		33	8.1	A	8.5	7	20	16.2	A	9.4		6	17.6	
9.0	59	18	17.9	A	9.3	13	59	36.8		9.2		54	4.3	A	8.9	9	0	4.2	A	9.5	28	30	28.9	B
9.1		26	12.6	A	8.5	17	14	40.7	A	9.3	31	33	4.3		9.4		5	17.3		8.0	29	49	53.0	A
9.5		53	29.5	B	9.5		27	56.9		9.5	35	25	16.4		9.5	10	52	38.8		9.5	32	43	25.0	
7.4	9 0	7	31.9	A	9.5	19	11	1.7		7.3	36	52	44.3	A	9.5	13	34	59.0		9.5		50	57.9	
8.9		12	33.7	A	8.5		16	22.5	A	9.2	40	21	7.0	A	9.5		35	56.0		9.4	33	7	50.1	
9.4	2	9	0.4	A	9.5	20	1	52.5		9.5	41	8	36.5		7.9	15	49	24.1	B	9.4		15	4.4	
7.0	4	8	28.6	A	9.0	22	7	39.3		9.0		55	51.2	A	9.5	17	53	45.0		9.5	36	0	56.5	
9.5	9	11	56.5		9.5	23	24	30.4		9.5	48	13	1.7	A	9.5	19	9	55.2		9.5	38	2	37.2	
9.4		23	3.2		9.5	26	18	26.3		8.6	50	58	48.3	A	9.5		10	33.7		8.4		11	27.4	B
9.4	10	7	19.3		7.7	29	4	54.0	A	8.7	51	32	19.7	A	9.5	22	33	37.2		9.2		33	22.2	

801—860					861—920					921—980					981—1040					1041—1100				
	14ᵘ—16ᵘ		+70°			16ᵘ—17ᵘ		+70°			17ᵘ—18ᵘ		+70°			18ᵘ—19ᵘ		+70°			19ᵘ		+70°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
9.5	14	38	38	19.3	8.0	16	3	25	30.4	A	9.4	17	19	3	50.1	9.4	18	12	51	54.1	9.3	19	1	8	55.4
9.4		41	7	54.4	9.5		4	36	50.5		9.1			3	15.2	B	9.4		13	6	20.2	B	9.0		42	29.5	A
9.3		42	2	9.3	6.5		5	22	38.9	B	9.5			51	13.7		9.5			47	3.1		9.5		56	58.3	
9.1			29	5.7	A	9.0		31	39.0	B	9.5		20	5	36.4		9.5		14	57	12.5		9.1		2	2	8.7	A
9.2			49	49.8		9.5		6	22	10.4		7.0			44	56.5	G	7.2		16	4	46.4	A	9.5		3	6	40.2	
8.4			58	26.2	A	9.1		8	16	41.9	A	9.5		21	27	24.6		9.3			9	2.4		8.9		5	4	22.5	
9.1		44	2	3.5	A	9.1			35	8.7	A	9.0		24	58	22.2	A	9.5		17	22	49.8		9.1		7	29	23.5	A
8.8		46	49	35.1	A	9.5		9	54	33.3	A	9.4		28	12	0.9	A	9.0		18	4	18.9	A	9.5		9	25	20.1	
9.3		48	18	34.1	A	8.1		13	31	58.0	B	9.3			51	40.8	A	9.5			15	7.5		9.5		12	52	29.4	
9.4		49	0	50.1	A	8.4			39	27.8	A	9.0		29	7	59.9	B	9.3		20	16	38.1	B	9.5		14	12	51.3	B
9.0			44	43.2	A	9.5		14	20	30.8		9.1		30	1	26.5	A	9.2			22	38.1	B	9.5		15	16	41.7	
9.0		51	52	3.7		9.3			29	57.5	B	9.2		31	1	36.4	A	9.3		21	19	57.1		9.5		17	0	2.5	
7.6		52	16	21.1	B	9.3		18	15	34.2		9.2			2	0.2		9.5		23	12	0.1		9.5		18	35	58.8	
9.5			36	27.1		7.3		20	22	42.4	F	9.4			43	1.9		8.8			43	29.2		9.5			53	7.7	
9.1		53	14	5.8	B	9.3		21	1	17.5		8.6		32	9	53.5	B	9.4		24	49	9.0	A	8.0		19	12	38.7	A
9.0		54	0	43.3		9.5		22	16	36.1	B	9.5			14	26.7		9.5		25	21	38.5		9.4		22	24	41.1	
8.6		56	48	38.9		7.2			34	49.9	F	9.4			25	28.8	B	9.0			46	58.6		9.1			32	26.0	
9.0		59	34	31.0		9.5		25	7	36.6	A	9.0			35	43.7	A	8.3		27	25	18.9	L	7.5		23	6	18.6	F
9.2			59	7.1	B	9.2		26	36	39.1	A	9.4		34	8	16.2		9.5			27	10.0		9.3			13	5.5	
9.5	15	1	57	37.0		9.5			53	46.5		9.5			44	7.0		9.3		30	27	58.9	B	9.4		24	41	4.1	
9.5		3	15	4.0		9.1		27	44	0.7	A	9.5		35	56	39.1	B	9.5			32	11.0		9.3			52	25.4	
9.5			26	25.1		8.6		28	55	3.3	A	9.4		36	29	13.0	B	9.5			47	21.0		9.5		25	33	0.8	
8.5		6	18	59.8	B	9.5		29	31	33.2	B	9.4			55	10.3		9.5		31	36	36.6		9.5		26	25	16.0	
9.4		7	12	16.9	B	8.5		34	20	55.1	A	9.1		37	19	23.0		9.5			45	26.3		9.0			53	50.2	B
9.4			33	15.4		8.5			23	51.1	A	9.5			45	0.5		9.4			54	37.5	A	9.5		28	41	21.1	
8.1			51	42.2	A	9.3		35	30	21.7	A	9.5		38	5	41.7		9.5		32	30	3.4		9.2		29	12	47.0	
7.2		8	11	13.1	A	8.2		37	29	5.4	A	9.0		40	54	24.0		9.0		35	28	8.9	A	9.0			39	59.7	B
9.4			13	15.6	B	8.0			53	6.8	A	9.5		41	10	15.2		9.1			41	7.6	A	9.0		30	7	10.8	B
8.9		11	13	26.1	A	9.4		38	48	47.3		8.5			16	42.4	B	9.5		36	32	35.5		9.4			10	15.5	
9.5			18	29.6		9.5			59	56.6		9.4		43	16	30.9		9.5		37	15	8.5		9.1			40	15.5	
9.0			42	7.3		7.9		39	4	43.1	F	9.3			34	3.4		9.3			36	48.3		9.0			52	36.7	A
9.5		14	22	52.5		9.1			26	19.2		8.5			55	45.7	A	7.5			41	18.4	A	8.0		31	35	37.7	A
9.1		20	7	16.8	A	9.0			28	37.9		9.5		45	4	7.9		9.3		38	16	44.4		6.3		32	7	40.7	A
9.0		24	52	16.6	A	7.8		41	28	30.6	F	9.4			35	35.0		9.5		39	53	31.7		8.9			18	16.2	
8.8		26	40	45.7	A	8.0			55	50.7	F	8.3		46	37	29.0	A	9.5		41	1	36.1		9.0		33	9	7.2	
9.0		29	56	51.9		8.4		46	44	30.9	B	9.5		49	13	3.0		9.4			41	35.1	B	9.5		35	37	2.8	
9.0		30	14	35.2		8.1		47	6	46.5	B	neb		50	54	10.9		9.1		42	18	30.1		9.5			37	37.7	
9.5		34	52	27.8		8.9			31	48.1		8.0		51	43	10.4	B	8.9		43	0	34.1	B	9.5		37	5	1.4	
9.5		35	56	46.5		8.9		49	10	22.0	A	9.5		52	15	47.5		9.5			12	14.0		9.3		38	3	6.2	
9.0			58	55.2		9.4		50	3	27.4	B	9.5			55	51.0		8.0		44	18	26.2	A	9.5			3	54.4	
9.5		37	31	51.4		9.5			48	11.2		8.6		53	1	16.4	B	8.8			22	49.8		9.2			13	25.5	
9.5		41	30	10.6	A	9.4			49	27.0	A	8.5		54	55	29.5		9.2			43	10.1	A	8.7		40	27	1.2	A
9.5			40	58.7		9.5		52	11	34.9		9.2		55	3	10.6		6.3			50	38.7	A	9.5		42	21	3.2	
8.8		45	58	56.4	A	9.4		53	44	10.0	A	8.8		56	41	52.6	A	8.8		45	28	57.4	A	9.1		43	8	31.4	
9.4		46	15	49.1	A	9.5		55	0	40.3	A	9.4		57	44	8.0		9.1		46	33	30.7	B	8.6			8	35.7	A
7.5		47	4	48.9	A	7.0			49	41.1	A	9.2		58	12	9.7		9.4			45	30.7	B	9.5			47	50.0	
9.4		48	31	30.5	B	9.0	17	1	49	14.7		8.7			19	5.2	A	7.8		48	12	13.8	A	9.5		44	3	24.0	
9.5			59	0.9	A	7.8		5	47	28.9		9.5			59	48.1		9.4			19	35.9	B	9.5		46	15	6.4	
9.4		49	15	34.1		9.2		7	26	0.1	A	9.2	18	0	21	7.5	A	8.5			45	48.2	A	9.0			21	56.8	
9.5			30	33.5		9.1			40	58.6	A	9.2		1	7	31.7	A	8.5		49	37	29.7	A	9.4		47	10	43.1	
9.5			38	15.4	A	9.4		8	6	10.7	A	9.4			43	4.5	A	9.2		51	28	6.7		9.5		48	44	53.1	B
9.2		56	12	56.1		9.0		10	16	22.5	A	9.1		2	21	6.4	A	8.5		52	16	8.2	A	9.4			49	54.6	
8.9		57	28	2.9	B	9.2			43	32.1		8.7		3	23	12.9	A	9.0		53	12	57.1	A	9.5		51	14	59.3	
8.5			43	41.9	B	9.5		11	54	0.5		9.5		5	16	7.3		8.5			59	41.5	B	9.5			14	39.2	
9.3		58	24	57.3		9.5		12	48	56.5		9.4		7	2	1.9		9.5		54	25	10.4		9.5			59	4.2	
8.6			40	7.6	B	9.3			55	30.1	B	9.0		8	16	37.0		8.0			38	16.4	A	9.5		52	29	7.4	
9.0		59	40	9.4	A	8.8		14	10	34.4	A	9.5			35	4.5		8.7			57	24.2	B	9.5		54	2	22.6	
9.5	16	1	4	9.2		8.7		18	22	46.7	B	9.0			38	25.3		9.4		58	17	16.4		9.2		58	57	52.5	
9.4			48	21.6		9.4			36	40.7		9.3		9	17	45.4		8.2	19	0	54	29.4	A	9.4		59	11	26.7	B
9.0		3	9	18.1	B	9.3			54	51.5	B	9.4		12	2	54.1		9.5			58	21.0		9.0			28	56.4	

1101—1149					1150—1198					1199—1247					1248—1296					1297—1345				
	20ᵘ			+70°		20ᵘ—21ᵘ			+70°		21ᵘ—22ᵘ			+70°		22ᵘ			+70°		22ᵘ—23ᵘ			+70°
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′
9.5	20	1	37	55.9	9.5	20	52	31	6.6	9.2	21	47	51	44.9	9.5	22	26	39	56.7	9.5	22	55	56	53.3
8.1			55	3.2	A	9.5		54	9	9.0	9.3		54	42.9	9.0			41	32.2	A	9.5			59	49.5
9.5		3	14	39.3	B	9.5		55	13	47.7	9.4		48	1	31.5	9.1		28	46	10.5	9.5		59	52	13.2
8.3		5	17	58.9	A	9.5			24	39.8	9.1		49	9	7.2	9.5			55	22.4	9.4	23	0	12	22.0
7.7		6	45	13.2	A	9.2		56	2	53.1	A	9.5			47	4.2	9.5		30	57	17.0	9.2			39	11.2
7.7		9	25	19.6	F	8.7		57	16	33.0	A	7.5		50	1	56.0	A	9.0		32	17	22.9	B	9.2		1	38	10.6
9.2			38	14.7		7.8		58	30	24.1	A	9.5		52	49	43.3		8.7			33	36.2		9.3			54	12.1
8.2		10	18	24.6	F	9.4			59	7.3	A	9.5		53	42	24.2		9.3			40	32.2		8.8		2	30	9.2
9.5		11	1	18.2		8.0	21	2	8	57.0	A	9.5		55	27	48.7		9.2		34	52	36.6		8.5		3	39	31.3	A
9.5		12	45	5.5		7.7			52	43.9	A	9.0		56	2	11.4	A	9.4		35	15	50.3		9.3			40	18.0	
7.8		13	37	39.8	A	9.5		3	15	3.3		9.0			56	10.4	A	8.3			50	57.7	A	9.0			45	33.3	A
9.2		14	45	24.3	A	8.3			20	10.4	A	9.5			57	51.1		9.3		36	11	38.8	B	9.5		6	13	59.8	
9.1		16	54	21.7	A	8.3			36	14.2	A	9.5	22	0	1	11.9		9.4			15	35.3		9.3		8	13	51.9	
8.3		18	0	41.7	A	8.7		4	48	38.5	A	9.2		1	26	52.2		9.5			56	36.8	B	9.2			29	0.0	A
7.5			18	19.1	A	6.0		5	31	50.6	A	9.5			55	56.5		9.5		37	18	17.8		6.0		10	3	5.8	A
9.5		19	44	37.3		9.5		6	34	24.5		9.5		3	44	14.9		9.5		38	26	7.5		8.3			29	0.6	A
9.5		21	25	58.2		9.5			44	0.4		9.5			56	46.2		9.5			35	1.7		7.8		13	3	31.9	B
7.8		23	8	36.7	A	8.0			47	48.0	A	9.5		5	34	11.9		9.3		39	49	25.4		9.2		14	45	32.0	
9.5		26	48	56.8		9.5		8	25	0.1		9.0		6	12	1.3		9.2			56	53.3		9.2		16	4	44.3	F
9.2		27	2	33.8	A	9.5		9	9	10.2		9.5			29	37.3		9.5		40	11	49.3		9.5			39	58.0	
9.5		28	13	50.5		8.5		10	2	47.5	A	9.0		7	1	37.0		9.5		42	10	7.5		9.5		17	0	7.4	
9.0			27	55.7	A	7.2			15	13.7	B	8.5			18	48.7		9.3			21	50.8		9.1			6	39.3	
8.9		29	41	55.5		9.5			50	11.7		7.7			34	25.7	A	9.4			33	12.0		9.5		20	57	48.2	
8.5		30	3	7.4	A	9.4		12	21	20.0		7.7			55	15.0	A	9.1			52	7.5		8.7		21	45	59.5	A
9.5			25	22.0		9.5		13	20	40.6		9.5		9	31	0.7		7.8			59	46.9	F	9.5		22	2	3.0	
6.8		32	6	3.1	A	9.5			20	25.9		9.5		12	39	47.8		9.5		43	13	3.2		8.3			21	18.1	A
8.8			22	39.8	B	9.0		15	40	56.3		8.8			46	56.7	A	9.1			27	57.2		9.1			26	23.1	A
9.5		33	22	38.8		9.5		16	55	3.9		9.5			52	52.3		9.0		44	18	18.4		9.5		23	56	36.4	
8.8		34	29	39.2	A	9.5		18	42	35.3		9.5		14	14	31.7		8.5		46	27	27.3	A	9.0		27	28	56.5	
9.0		36	30	19.1		9.4			47	18.5		8.8			47	59.2	B	9.5			29	22.3	A	9.4		28	31	31.5	
9.2			39	39.2	A	9.5		22	57	16.1		8.8		16	14	4.4	R	9.2		47	36	7.0	A	6.0			41	49.6	G
9.5			58	28.4		9.5		24	12	49.4		9.0			46	51.3		9.2			42	5.0	A	8.7		30	58	53.6	S
9.5		37	41	7.7		7.7		28	54	21.5	A	7.8		17	17	58.2	F	8.8		48	17	20.8	A	8.5		31	7	16.7	
9.3		38	17	32.9		7.2		29	6	9.7	A	9.4		19	23	1.7		9.5		49	35	56.7		9.4		32	48	39.6	
9.0			37	55.0	A	9.1		30	48	54.9		9.0			33	9.0	A	9.0			37	59.2		9.3		33	7	5.1	A
7.8			39	40.2	A	9.5			55	31.3		7.0		20	38	34.7	A	8.1		50	9	34.7	A	9.4		34	7	5.0	A
9.5		39	16	48.5		9.5		31	12	21.5		9.0			47	44.7	A	8.0			14	46.5	A	9.4		37	8	41.2	
9.5		40	49	15.9	B	9.5		32	45	17.0	A	7.8			55	18.4	A	9.2		51	7	8.2	A	7.5		40	56	41.3	A
9.5		41	30	16.1		9.4		34	9	36.7	A	9.1		21	1	56.3	A	9.4			13	43.5	A	9.5		43	44	57.0	
9.5		42	35	53.0		9.5		35	12	22.5	A	8.7			11	20.4	A	9.5			44	27.8		9.3			52	36.4	
9.1		43	16	21.7	A	7.1		37	8	39.2	B	9.4			54	15.5	A	9.5		53	31	46.0	A	8.8		46	37	41.1	A
9.1			36	22.7	A	8.0			39	46.6	A	6.0		22	18	1.7	A	9.5			45	49.8		9.5		49	54	1.4	
9.5		46	24	51.8		7.0		38	21	7.6	B	9.0		23	8	15.5		9.4			53	6.7		8.7		53	15	1.5	A
9.3			48	7.3	A	5.0		39	48	38.1	G	9.5			51	33.7		9.0		54	8	14.7		9.5			19	43.3	
8.6		48	6	10.4	A	8.8		42	8	19.2		7.7		24	8	4.0	A	9.2			12	1.9		8.0			59	7.0	A
9.5			33	41.3		9.4		43	29	37.0		9.2			54	12.5	A	9.4			29	19.0		8.0		55	31	32.6	S
9.5			57	58.5		9.3		44	38	10.9		9.4			58	54.5		8.8			39	39.1	A	9.4		56	14	16.4	
9.0		50	15	43.3	A	9.5		47	11	0.4		8.8		25	14	56.2		9.2			57	6.5		9.5		58	41	42.9	
9.5		51	39	36.6		9.1			18	4.6		9.3			41	33.7	A	9.2		55	19	36.7	A	9.3			46	9.6	A

Zone +71°

1—40					41—80					81—120					121—160					161—200				
	0ᵘ			+71°		0ᵘ—1ᵘ			+71°		1ᵘ			+71°		1ᵘ—2ᵘ			+71°		2ᵘ—3ᵘ			+71°
m	u	′	″	′	m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.4	0	0	30	5.3	8.9	0	44	24	6.3	A	9.3	1	18	56	38.9	B	8.7	1	58	43	36.9	A	9.1	2	31	47	2.0	B
8.8			52	10.0	A	9.5		47	16	46.3		9.5			59	42.7		9.1	2	0	13	10.4	A	9.5		32	29	59.7	
9.5		1	11	27.1		9.0		49	25	21.6		9.0		21	49	25.0		9.5		2	20	53.5		8.4			39	21.0	B
9.5		3	33	54.9		9.5		50	8	20.0		9.2		22	10	31.6		9.3			49	44.3		9.4		33	0	21.0	B
9.5			48	16.8		9.5			9	0.4		8.5			44	6.0	A	8.9			59	37.2	A	8.0			28	6.3	A
9.4		4	59	39.1		9.4		51	54	20.2		9.5		23	34	6.5		9.5		3	1	9.4		9.5		34	20	22.2	
9.3		5	49	54.9		9.5		52	24	28.9		7.8		24	22	40.4	A	8.4		5	12	39.8	A	7.5			43	45.4	A
9.2			54	45.0	A	9.1			44	19.9		9.5			28	23.8		9.0		6	54	5.9		9.0		35	1	11.1	A
9.2		8	22	7.3	A	9.1		53	23	52.2		8.8		25	30	12.9	A	9.5		7	5	51.6		9.5			4	25.6	
8.5		9	44	12.8	A	9.5			35	14.7		9.5		26	47	27.3		9.5			29	57.5		9.3			58	31.1	
9.5		14	35	26.6	B	9.1		55	30	26.5		8.0		27	0	50.1	A	9.1		8	49	31.6		7.7			58	9.2	A
9.5			55	30.1		9.5		57	24	21.4		9.5		29	57	14.1		9.5		9	14	24.5		9.3		36	35	24.5	
9.5			57	25.1		9.4			36	23.9		8.8		30	1	30.4		9.4			27	46.2		9.4			51	24.5	
9.5		16	40	52.0		9.4		59	34	19.0		9.5			52	43.4		9.3		11	15	54.5		9.5		40	1	0.8	
9.5		17	21	24.0		9.5	1	0	36	50.1		9.5		31	22	19.3		9.5			53	17.6		9.2		41	30	44.2	B
6.6			31	0.2	A	9.2		1	20	1.7		9.5			49	6.7		9.5		12	24	43.2		9.5			30	31.0	
9.2			31	11.2		8.9		2	14	37.9		9.5		32	31	7.6		9.4		13	13	33.6		9.0			43	12.5	
9.5			41	6.0		8.7		3	15	22.5		9.0			31	17.3		9.4			55	23.0		9.4		43	21	46.9	
8.5		21	50	45.1	A	8.3			46	43.7		9.1		33	0	45.8		8.7		14	41	7.6	B	7.9			59	33.5	A
9.5		24	14	41.6		9.5		4	38	9.6		8.2			41	9.4	A	7.7			45	28.5	B	8.3		48	10	26.1	A
9.5		25	13	0.4		9.4		5	10	12.0		9.1			41	32.4		8.5		15	30	11.9	B	9.4			42	3.8	
9.2			20	38.2	A	9.4		6	28	40.7		8.8			57	27.9		9.3			32	30.2		9.2		49	31	58.1	B
9.0		26	0	57.0	A	9.3		8	5	9.1		9.1		34	0	32.6		9.5			42	22.4		9.5		50	23	2.3	
9.0			9	43.1	A	6.8			14	38.5	A	8.7			47	31.1	A	9.3		16	31	26.6		9.1			45	41.4	
8.5		27	11	42.1	A	9.5			19	58.2		9.0		35	31	2.5	A	9.1		17	17	31.9	A	9.5			46	55.8	
9.2		28	25	2.3	A	var		9	4	50.8	B	9.1		37	31	0.6	A	8.5			23	33.9	A	9.4		52	59	38.5	
9.5		29	42	57.4		8.6			6	59.0	A	9.1			50	1.0	A	9.4			58	36.8		8.0		54	10	58.7	A
8.8		30	57	17.2		9.5			12	7.9		9.1		39	32	53.1		9.5		19	23	7.1	B	9.5		59	22	4.5	B
9.0		32	33	59.8	A	9.5			24	48.5		8.5		42	49	22.1	A	9.5		20	15	3.3		9.5	3	1	51	1.3	
9.3		33	6	27.7		9.1			38	18.6	B	9.1			57	47.8		9.3		22	56	24.7		8.9		3	44	44.9	
9.3		34	28	22.9		9.4			44	18.5		7.4		45	18	0.2	A	9.5		23	5	33.5		9.5		5	33	24.7	
9.5			39	4.3		9.5			52	38.0		9.4		46	50	44.5		9.4		25	38	28.9		9.5		6	26	10.9	
9.5			57	12.0		9.1			56	15.8	B	9.3		47	50	14.5		8.4		26	41	40.3	B	9.5			51	54.2	
9.3		35	9	29.7		9.5		10	8	50.5		9.4		48	6	1.5		9.1			45	32.2		9.5			57	11.7	B
9.2			19	34.6		9.3			49	21.1		9.4			13	45.3		9.2		27	33	16.2		8.9		7	55	32.1	B
9.3		38	10	49.9		9.5		12	4	32.4		9.5		49	56	50.2		9.4		28	0	51.1		9.2		10	41	1.3	
6.5			45	52.9	B	9.5		14	31	50.5		4.0		51	12	41.8	A	8.5			24	3.8	A	7.6			43	9.6	A
9.5		39	27	26.1		9.5		16	28	27.1		9.5		53	25	53.7		9.0		29	26	29.9	A	7.2		11	41	40.8	A
9.5		42	3	45.3		9.5			43	16.8		8.0		55	46	8.4	A	9.1			41	29.2	A	9.5		14	15	33.8	
9.5		43	25	22.2		9.5		17	58	31.1		8.8		56	10	13.8	A	9.4		31	45	21.5		9.5			17	40.1	

201—260						261—320						321—380						381—440						441—500					
	3u—4u			+71°			4u—5u			+71°			5u—6u			+71°			6u—7u			+71°			7u—9u			+71°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
6.5	3	15	21	21.1	A	9.3	4	19	12	16.7		9.4	5	31	3	55.5	A	8.8	6	48	23	39.8	A	9.5	7	51	18	26.8	
8.7		16	22	39.8	A	8.8			42	1.6	B	9.5		33	55	54.5		9.4			41	20.9	A	7.8		52	49	41.1	A
8.5			31	30.3	A	8.2		21	17	35.1	A	9.2		35	19	36.6		9.5		50	22	21.4	A	9.5		53	43	11.1	
8.4			32	20.9	A	8.7			26	10.1	A	6.7			22	14.6	A	9.4			45	25.7	A	9.4		56	36	29.8	A
8.6			35	40.5	A	8.0			55	10.1	A	9.1			30	3.3	A	9.5		52	18	18.7		9.2		57	23	29.3	A
9.5		18	47	7.3		9.4		24	32	39.4		9.5		37	39	1.6		9.5		53	26	50.8		8.9	8	1	16	38.2	A
9.3		19	21	42.5		9.5		25	30	37.8		9.5		40	27	22.4		9.3		59	14	11.4		9.0		2	17	12.6	A
9.4			35	33.6	B	8.9			43	3.6		9.2		41	44	31.9	A	8.9	7	0	5	48.5	A	9.5		3	16	4.2	
9.5		22	47	43.9		9.3			48	4.6		9.5			44	36.5		8.3		1	57	9.9	A	9.5		4	2	58.0	
9.5		23	31	52.7		9.5		27	6	45.1		9.3			46	42.4		9.4		3	28	34.5		9.5		7	1	56.0	
9.5		24	8	45.8		8.9		29	9	26.4		9.0		42	5	19.2	A	8.1			30	30.6	A	9.5		9	39	18.9	
9.5			43	50.2		9.5		30	5	10.5		9.3			40	55.0	A	9.5			33	49.9		9.4		10	57	51.0	B
8.4		25	35	9.8	A	9.4		32	55	24.6		9.4		44	36	29.2		9.5		4	52	49.0		8.8		11	19	30.7	A
9.5		27	6	31.4		9.5		33	10	21.8		9.2		47	39	5.1		9.3			56	23.0		9.0			50	47.2	A
9.0		29	47	49.3	A	8.6			28	27.3	B	9.5		48	35	22.8		9.5		6	21	20.8		9.4		12	3	49.1	A
7.0		30	58	8.8	A	8.7		34	58	18.1	A	8.6			54	1.0	B	9.5		9	47	21.7		9.5		13	44	28.4	
9.0		32	25	0.0	A	9.4		35	37	12.1		9.5		49	6	31.1		9.5		13	28	57.3	B	8.8		14	4	44.7	A
9.5		33	29	30.6		9.0		39	29	1.2		9.3		52	47	40.8	A	9.5		14	2	49.0		9.5		15	4	25.9	
9.4		34	18	55.1		8.8		40	28	38.7		9.1		53	39	34.2	A	9.5			58	2.9		7.7		16	16	30.3	A
9.3		36	36	54.6		8.5		41	38	9.5	A	7.0		55	5	8.1	A	9.3			58	31.0	A	9.0		18	40	9.3	
9.0		38	31	58.9	B	9.2		42	8	18.4	B	9.5			10	13.3		9.5		15	19	46.5		9.5		20	3	2.7	
6.5		40	58	22.0	A	8.0			50	22.9	A	9.3			52	40.4		7.3			48	39.5	A	9.5		22	3	1.7	
9.1		42	9	0.5		8.8			55	15.5	A	9.5		56	14	13.3		9.4		17	7	8.9		9.5		23	10	3.2	
9.0		43	16	26.0		9.2		43	43	21.3		9.3		58	14	1.1		9.0			22	56.8		9.5			56	42.7	
9.5		45	59	9.8		8.5			50	13.9	A	8.8			30	24.7		7.4			44	53.1	G	9.5		25	59	56.0	
9.4		48	14	53.8		9.5		45	22	20.9		9.5		59	59	49.2		9.3			50	23.6		9.5		29	47	18.9	
9.1		49	0	48.6	A	8.4		46	0	5.2	A	8.9	6	0	15	38.2		9.5		18	58	32.8		9.3		30	15	51.1	
9.5			55	3.9		8.2			25	56.6	A	8.9			51	56.5	A	9.5		21	1	32.5		8.5			27	48.6	A
8.9		50	39	37.6	B	9.5		48	51	43.4		8.7		1	7	1.1		9.5		22	21	35.8		9.3			48	9.6	A
9.5		51	50	38.6		8.0		50	17	52.3	B	8.4		4	37	19.4	A	9.5		23	9	19.1		7.8		31	29	27.7	B
9.5		53	5	11.7		9.5		52	26	33.4		9.4		8	29	46.2		8.8		24	4	59.8		9.3			50	13.0	A
9.5			38	55.3		8.2		53	1	20.7	A	9.4		9	33	3.2	B	9.5		25	23	59.8		9.5			55	19.4	
9.5			46	58.8		9.5			38	35.0		9.4		14	50	48.7	A	9.5			29	57.8		9.4		32	7	59.5	
9.5		54	41	25.2		8.7		54	46	28.5	A	9.4		15	32	51.7	A	9.3		26	22	27.3		8.7			18	6.1	A
9.0			45	37.1	A	9.0		55	16	21.5	A	9.5		17	55	13.6	B	9.0			40	0.5		8.9			51	47.2	
9.5			55	19.1		9.1		56	25	14.5	A	8.2		19	51	25.5	A	9.5		27	56	52.3		9.4		33	58	26.6	
8.9		56	34	53.6	B	9.5		57	11	32.5		9.0		20	11	32.1	A	9.5		28	20	25.0		9.1		34	26	25.6	A
9.5		57	32	27.5		9.0	5	2	49	18.5		8.0		22	12	14.6	A	9.5			24	58.8		9.5		37	37	46.7	
6.3			40	44.0	A	6.8		3	45	32.8	A	6.0		23	24	52.0	A	8.3			33	4.4	A	9.4		39	33	13.5	
9.5		58	38	13.2		7.5		4	21	3.2	A	9.0			24	48.8	A	9.5		31	3	49.5		9.3			34	7.1	
9.5	4	0	47	13.7		9.3			51	50.2	A	9.1		25	28	23.9		9.5			26	48.5		8.7			40	0.7	A
9.2		1	10	55.0		9.5		8	52	14.0		9.4		26	3	31.1		9.5			27	58.3		8.5		41	38	21.0	B
9.5			30	40.0		9.1		9	42	49.3		8.7		29	40	29.8		9.4			30	15.2		8.5		43	32	58.5	
9.1			40	48.3	B	8.4			49	2.7	A	9.5		31	33	50.7		9.0		32	3	8.9	A	7.0		44	1	13.5	A
9.0			50	53.0	B	9.5		10	43	22.3		8.4		32	47	45.7	A	9.5		33	14	34.9		8.7		47	6	58.9	B
9.5		2	57	54.3		7.7		13	50	46.9	A	9.0		33	12	9.4	A	9.5		34	6	9.4		6.7		49	32	51.6	A
9.0		5	5	43.0	A	9.5			51	20.9		9.5		35	12	1.1		9.2		35	56	48.5		8.8			38	59.9	A
9.5			36	47.0		9.0		14	15	56.2	A	9.2		39	33	23.7	A	8.0		36	10	35.2	A	9.4		52	47	44.5	
9.3		8	51	49.4		9.5			22	38.2		9.3			48	39.4		6.8		38	27	27.0	A	8.8		53	26	4.6	
7.5		10	56	25.1	A	9.4		16	40	45.8	B	9.5		40	18	13.8		9.0		41	45	6.2		9.4		55	58	36.5	
9.5		11	22	27.0		9.4			54	37.1		8.7		41	27	55.3	A	9.5		42	17	37.0		9.3		56	50	55.7	B
8.7			25	37.8		9.4		18	50	50.6		8.8		42	1	5.4	B	9.0		43	17	7.2		6.5			50	57.4	A
9.0		12	22	40.6		6.8		20	50	33.2	A	9.5			41	41.0		9.3		44	15	53.6		9.5	9	0	41	31.8	
8.0			51	19.6	A	8.0		24	58	32.8	J	9.0		45	12	6.5		9.4			28	58.6		9.5		2	12	20.9	B
9.3		13	41	0.5		8.6		25	42	12.0		9.4			38	38.2		9.4			56	1.4	B	9.5		3	6	40.0	
9.0		14	10	4.4		8.8		26	37	36.6	A	9.4		46	4	31.2		9.5		45	10	1.3	B	9.0			20	55.3	
9.3		15	12	30.5		9.4		27	54	46.2	A	9.0			18	33.0	A	8.9		46	55	29.4	A	9.0		5	39	41.0	
9.1			12	0.9		9.2		28	33	20.9		7.7			35	56.8	A	9.5		48	43	30.9		9.5		6	1	13.8	
9.4		18	0	36.1	s	8.0			55	50.7	A	9.3		47	20	27.7	A	8.9		50	17	37.1	A	9.0			17	0.5	
9.1			5	54.8		9.2		29	40	31.6	A	9.4			22	23.2	A	9.5			34	57.5		9.1		7	56	30.8	A

501—560					561—620					621—680					681—740					741—800				
	9u—10u			+71°		11u—12u			+71°		12u—14u			+71°		14u—15u			+71°		15u—16u			+71°
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
9.5	9	8	55	14.7	9.5	11	0	10	43.5	9.5	12	27	2	43.5	A	9.5	14	6	20	53.3		7.2	15	38	12	36.7	A
9.5		11	43	54.2	9.0		3	28	32.9	9.1		31	6	52.7	A	8.5		9	5	2.2	A	9.0		35		5.1	A
8.5		12	1	3.5	A	9.3		45	47.5	A	9.5		34	1	51.8		9.1		15	19	1.6	A	9.4		41	5	36.0	A
7.3		21	5	42.0	A	9.5		4	28	4.6		9.1		16	35.4	A	9.3		18	33	0.6		9.5		43	20	15.9	
9.5		24	13	44.7		9.4		6	54	35.7		9.5		36	42	55.2		8.8		21	13	8.0		9.5		33		25.8	
9.5		25	3	0.7		9.1		8	4	28.9		9.5		38	16	38.8		8.8		24	10	30.5		9.5		44	44	19.4	
9.2			9	16.0		9.3			10	42.1		9.1		39	42	15.2		9.4		25	56	54.3	A	8.7		45	0	40.1	A
9.5		28	58	18.6		7.5		10	44	44.0	A	9.5		41	6	6.3		8.5		27	40	44.2	A	9.1			2	22.8	A
8.0		31	8	5.6	A	9.5		12	4	53.9		9.2			34	32.4		9.4		29	26	25.0	B	9.1			9	37.2	A
9.2			42	45.3	A	9.3			35	45.6	B	7.0		42	25	44.4	A	9.4			32	26.0	A	9.5		47	49	46.7	
9.5		33	33	35.1		9.2			41	42.0	B	8.6		44	29	10.3	A	9.3		37	33	39.9		9.2		48	11	3.1	A
9.5			41	28.2		9.5		15	46	44.0		9.5			30	59.7		9.2		38	55	44.2	A	9.0		50	30	6.6	A
9.5		37	24	24.6		9.5		19	57	3.2		9.5		45	35	53.6		9.0		39	18	24.5	A	7.7		52	29	46.7	A
8.7		38	47	5.1	A	9.1		21	3	41.5		9.5		48	19	42.9		9.5		40	9	26.0		8.5		54	32	42.3	A
9.2		39	49	0.7	A	9.5		24	11	51.4		9.3		49	53	10.2		9.2			54	56.0		9.5		55	16	33.9	
9.5		40	14	51.2		8.5		26	39	35.9	A	7.8		51	59	32.4	A	9.2		42	46	0.4		9.1			19	3.3	B
9.5		41	55	22.0	B	9.0		27	36	44.2		9.4		53	44	15.7		9.3		43	33	42.7		9.5			24	56.0	A
8.0		42	46	45.6	B	9.5		28	53	21.3	A	7.2			56	22.6	A	9.2		44	26	31.4		9.4			39	4.6	
9.5		46	53	8.6		9.4			54	43.0	B	8.8		54	43	50.4		9.3		49	27	57.0	A	9.1		56	20	1.3	
8.8		47	15	28.2		9.5		29	16	41.0		9.3		56	29	25.6	B	9.5		50	0	32.3	A	9.5			41	39.3	
9.0			24	46.8		9.1			50	17.8		9.5		58	35	52.7		9.4		53	49	51.7	B	9.2		58	39	51.6	
8.7		48	18	26.0	B	9.0		30	7	32.5	A	9.2			37	40.0	A	8.7			55	29.6	B	7.0		59	5	19.5	F
9.5		49	59	7.1		9.1		33	17	44.4		9.5	13	1	7	4.4		9.2		54	11	3.0		9.5	16	0	27	3.2	
8.0		50	19	27.5	B	9.5		36	52	14.0	B	9.5		4	52	13.7		7.8		55	59	24.4	S	8.2		4	56	30.6	B
8.2		52	12	34.4	A	9.5			59	9.3		9.3		7	31	18.2		8.4		57	41	42.5	F	9.5		5	42	17.0	
9.3		53	35	31.0		9.5		38	39	1.0		9.5		10	19	4.4		6.8		59	22	11.3	F	9.3		8	50	54.2	
9.5		54	51	13.5		9.5		40	22	2.0		9.3		13	32	38.3		8.5	15	0	43	40.1	F	9.5		11	16	15.5	
9.2		58	42	52.6	A	8.0		43	4	54.6	A	9.3		15	53	15.2		9.3		1	5	10.6	B	7.5		12	3	40.5	B
7.5		59	10	33.5	A	9.5		44	6	26.2		9.5		16	46	21.0		9.0		2	1	43.5	A	9.0		14	27	51.6	A
9.2			44	55.1	A	9.5		45	20	54.7		9.5		20	24	32.7		7.7		4	15	19.2	A	9.0			28	59.9	A
9.5			53	44.3		8.5		48	43	5.4	A	7.2		23	6	4.6	A	9.5		5	30	41.5		9.4			30	23.0	B
9.5	10	1	12	44.3		9.5		49	20	56.7		8.8		24	57	16.9	A	9.4			33	10.0		9.5		15	23	8.5	
9.5		5	41	42.2		9.4		50	5	36.9		9.3		27	4	29.0		9.4		6	7	54.3		9.5			32	49.1	
6.3		6	6	47.1	A	8.7		52	18	8.9	A	7.3			37	10.1	A	9.3		9	44	50.9	A	8.0			44	11.5	B
9.3		7	14	9.1	B	8.0			31	28.2	A	9.3		29	10	57.2	A	9.4		10	8	19.6	A	7.3			53	17.9	B
9.0		11	11	59.6	A	8.0			35	27.7	A	9.5			25	6.2		8.6			53	33.6	A	9.1		16	1	52.0	
9.4		14	46	4.4	B	9.5		53	19	51.8		9.5		30	24	32.6		9.5		12	12	29.0		9.5			50	22.8	
9.3		15	0	21.4		6.5			20	2.0	A	9.5			39	52.8		7.5		13	22	51.9	A	9.0		19	35	49.7	A
9.5		17	57	2.8		7.2		54	9	39.7	A	5.8		33	43	59.1	G	9.5		14	52	30.2		9.0		20	7	47.2	B
9.5		18	5	28.6		9.5		55	59	14.3		9.5		35	52	24.7		8.8		15	27	49.4		9.5			27	15.4	
9.5			34	32.8		8.6		56	49	57.1	B	9.5		37	31	3.2		9.5			32	14.7		9.1			40	28.2	
8.7		26	25	24.9	A	9.5		58	51	10.9		9.5		38	13	1.6		7.7		17	13	44.5	G	9.5			48	58.1	A
9.5			57	50.4		9.4			54	11.1	B	9.1		39	36	10.1	A	9.2		19	47	32.6		9.5			50	29.7	
9.5		28	8	10.5		9.5		59	0	5.7		9.2		40	12	28.9	A	8.8		20	59	10.3	A	9.4		22	28	10.6	
9.0		29	33	52.2		9.5	12	2	10	21.3		9.3		41	41	30.3	A	9.5		21	12	41.0		9.1		23	14	56.0	A
9.5		30	6	16.9		9.1		5	26	34.8	A	9.0		47	30	51.8	A	9.3		22	48	30.1	A	7.5		24	12	8.0	F
9.5		33	11	35.7		8.5		6	12	40.5	A	9.1		48	5	20.9	A	9.5			56	4.6		9.4		25	11	22.3	A
9.1		36	1	6.1		9.1		7	40	28.5	A	9.4			29	26.2		9.2		23	21	30.0	B	9.5			22	10.0	
9.5		38	9	18.4		9.4			55	26.1	A	9.2		50	36	26.8	B	9.5		24	19	14.9		7.1		26	5[illegible]		
9.5		39	58	10.1		6.0		8	11	1.5	A	8.9		51	41	9.1		8.0		26	10	49.1	A	9.3		27			
9.3		41	27	5.6		9.5			32	14.3		9.3		53	45	34.9	A	9.5		27	41	14.9		9.1					
8.8		44	3	24.1	A	9.5		12	20	22.6		9.0		55	3	12.5		9.1		28	18	9.2	A	9.0					
9.5		46	37	56.8		8.3		16	20	7.9	F	8.0		58	8	39.4	A	8.3			49	10.0	A	9.0					
9.1		49	1	22.8	A	9.2		18	14	26.3		7.7		59	15	1.7	A	9.0		30	17	46.9	B	9.5					
9.5			33	50.6	B	9.2			16	39.4		9.5	14	2	9	31.3		8.8		32	53	10.5		9.5					
9.5			35	56.8		9.5		19	52	19.4		9.5			34	4.8	B	8.5		33	5	49.1	A	9.3					
7.9		52	29	9.6	A	9.5		20	6	3.1		8.7		4	2	38.8	A	9.1			21	7.0		7.[illegible]					
8.6		54	48	10.0	A	9.5		21	2	37.1		9.4			20	17.5	A	9.5			57	37.9	A	9.					
9.5		56	11	0.7		9.5		26	21	49.9	A	9.4		5	15	15.5	A	9.0		35	13	47.2	A	[illegible]					
9.5			53	5.6		9.5			55	56.7	A	9.4			17	54.2	A	8.9		36	1	51.1	A						

801—860					861—920					921—980					981—1040					1041—1100				
	16ᵘ—17ᵘ		+71°			17ᵘ—19ᵘ		+71°			19ᵘ		+71°			19ᵘ—21ᵘ		+71°			21ᵘ		+71°	
m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	
9.4	16	36	18	59.4	9.4	17	59	45	56.5	9.4	19	1	58	8.2	B	7.7	19	58	1	55.5	A	9.5	21	2	50	47.3	
9.5		37	50	44.6	9.5	18	0	5	9.0	9.4		2	0	27.5	B	9.5			8	42.3		9.5			51	56.0	
9.3		38	2	25.2	9.5		1	56	6.6	8.3			0	18.0	A	9.4			13	45.2		9.5			51	31.1	
8.7		39	44	54.4	A	8.0			58	37.4	L	9.3		4	13	56.1		9.0		44	27.8	A	9.1		4	13	3.0	A
9.5		41	43	23.5		9.0		3	19	11.8		9.3		5	20	58.5		9.0		46	57.5	A	9.4		6	0	13.6	B
9.1		43	39	5.4		9.5		4	35	50.0	B	9.3		7	4	20.4		8.7		57	31.5	A	7.8			44	5.3	A
9.4		44	32	38.1	B	9.0		6	2	23.9	A	9.3			20	46.2		9.3		59	7	47.8	B	9.5		7	11	53.1	
9.5			43	34.1		8.8			6	6.4	A	9.0			26	49.2		9.5			33	50.2		9.5			16	58.5	
9.4		46	14	22.2		9.4			46	20.0		9.1		8	42	48.3	A	9.5			53	50.6		9.5			31	37.4	
8.0		51	38	9.3	A	9.4		7	30	55.4		9.3			47	15.5	B	9.5	20	0	4	37.9		9.4		8	2	43.8	
9.5		53	2	44.6		9.5		8	32	38.3		9.4			51	28.3		7.5		1	21	29.0	A	9.3			26	47.2	
8.1			19	31.0	F	8.0			45	25.3	A	7.2		9	10	50.6	A	9.3		2	51	41.5	B	9.0		9	58	31.3	A
9.2		54	10	17.2		9.0		9	22	29.1	A	8.8			50	3.3		9.5		4	6	57.5		9.3		10	13	2.3	
9.2		57	54	46.1	A	9.5			59	27.6		8.5		10	10	15.3	B	9.5			32	12.1		8.0		11	36	52.1	A
9.2		58	28	7.1	A	8.8		10	12	1.6		8.8		11	20	20.3		9.5		5	13	20.5		8.7		12	48	24.7	
8.9			29	28.4	A	9.5		11	1	33.1		7.5			56	59.9	B	8.8			36	57.5		9.1		13	35	51.6	
7.8		59	15	40.3	A	9.4		12	1	28.6		9.4		12	11	25.8		9.5		6	5	14.6		9.5		14	14	9.5	
8.9	17	0	27	18.9		9.5			27	23.9		8.3			24	52.0	A	9.2			54	39.3	A	8.5		16	48	33.2	A
9.5		3	3	45.3	B	9.5		13	34	49.3		9.1		14	5	38.9		9.5		7	20	31.1		9.2			56	17.6	B
9.0			22	2.3		9.5			56	56.3	A	9.2			19	17.0		9.5			25	26.1		9.1		17	5	23.1	A
8.1		4	28	3.7	B	9.4		16	47	53.2		9.3			54	4.8	B	8.8		8	17	19.6		8.9		19	22	44.3	A
7.5			42	15.6		9.5		19	11	12.4		8.3		16	25	1.8	A	9.0			21	0.9		6.8		20	47	26.7	A
8.2			55	1.7	B	9.5			30	47.3		9.0			28	16.0		8.3			44	6.2		9.4		21	58	43.3	
8.8		6	27	57.9	A	7.7		21	25	27.0	A	9.0		18	31	6.7		9.2		10	34	23.5	A	8.3		22	7	29.3	A
9.5		7	27	38.8		9.3			31	10.5	B	6.8			53	4.2	A	8.2		11	5	16.6	A	9.5		23	13	42.3	
9.5			30	34.3		9.4			49	9.0		8.9		19	48	27.2	B	9.5			9	6.8		8.8			54	54.1	A
9.0			53	13.1		9.5		22	7	12.2		9.5		20	20	27.5		8.1		12	14	33.7	A	9.4		24	32	55.6	
9.2		10	15	10.7		9.3			52	3.5		9.4			26	5.8		9.4		14	1	25.5		8.5			51	57.0	A
9.4			18	29.0		4.7			59	14.4	A	7.5		22	41	50.5	L	9.2			6	10.7	A	9.5		27	33	47.2	
9.5		14	13	1.9		9.5		24	22	37.5		9.0		24	11	33.3		9.5		15	29	32.4		9.5			49	14.1	
8.5			26	15.7	A	9.1		26	58	48.1	B	8.2			43	36.9	B	9.0		16	0	42.3	A	9.5		28	1	25.0	
9.4			28	39.2	A	9.4		27	35	50.4		9.5		25	48	22.5	B	9.5			29	50.6		8.1			43	2.6	B
9.5		17	50	26.5		9.5		28	2	25.1		8.3			52	42.2	B	9.5		18	11	51.6		9.4		29	30	18.4	
9.5			55	39.4		7.5			10	36.6	J	9.1		26	25	37.3		8.4			14	19.5	A	8.7		30	5	26.0	A
6.8		18	29	56.5	B	9.3			20	14.3		8.5		31	33	37.8		8.5		21	36	30.4	A	7.6			14	24.1	A
8.5			47	44.9	B	9.2		29	23	47.9		7.5			47	57.4	A	9.4		25	19	4.8		9.5			58	42.3	
9.4		19	42	41.2		9.5			29	44.5		9.3		32	3	10.7	B	9.5		26	1	3.3		9.5		32	38	57.1	
9.5		20	32	27.5		9.0		33	40	13.4		8.3			34	21.6	A	8.5		27	32	53.1	A	9.5		35	18	26.7	
9.5		22	38	7.3		8.8		34	57	12.8	A	9.4			46	54.0	B	8.9		32	23	2.9	A	9.5			33	15.2	
9.1		25	22	46.2		9.5		36	1	15.8		8.3		33	35	1.2	B	9.4			26	22.8		9.5		38	36	37.3	
6.8			36	59.8	A	8.5		37	49	17.8	A	9.4		34	25	5.8		8.8		35	12	42.1		9.5			40	15.9	A
9.4		26	32	16.7		9.5		40	52	11.9		9.2			37	47.5		9.5		36	20	21.8		5.5		41	18	37.9	G
9.4		27	27	42.2		9.5		42	9	7.5		9.5		35	18	35.3		9.5		37	19	13.1		9.1			19	56.5	B
8.8		29	55	18.6	A	9.5			21	57.6		6.7			51	17.3	A	9.5		38	19	20.5		9.4			50	49.1	
8.2		31	46	23.5	A	8.7		43	55	17.4		9.4		36	12	21.8		8.3		39	57	41.6	A	8.6		42	11	23.3	J
7.5		33	31	20.2	A	8.3		44	25	29.7	A	9.5		37	28	59.4		9.5		40	28	15.6		9.4			48	4.9	
8.2		34	29	40.2	A	8.8			40	19.0	A	9.5		38	50	32.4		8.7		41	3	19.2	A	7.5		43	34	29.2	A
9.4		35	15	16.1	A	9.0		46	7	5.4	A	8.8		39	11	11.7	A	9.2			40	54.9	A	9.5			57	27.6	
9.5			22	58.9		9.5			15	28.0		8.9		40	55	58.0		8.4		45	33	13.8	A	9.4		44	9	40.3	A
8.3		38	36	57.5		9.5		49	20	8.4		9.0		42	16	12.0		9.3		46	7	3.5		9.2		45	6	58.4	A
9.0		40	43	23.5		9.5		50	53	32.5		9.2			57	47.2		9.4			56	50.6		9.4			39	14.8	A
9.0		41	31	2.8		9.0		52	28	46.8		9.3		44	28	22.7		9.5		48	18	33.8		8.5		47	59	4.2	A
8.9		43	36	34.3	A	9.1		53	36	8.9		7.8			51	59.4	A	8.1		49	8	13.8	A	8.9		48	11	18.0	A
9.2		44	9	43.2	A	7.5		55	7	35.0	A	9.0		46	19	51.0		9.5		53	15	13.8		9.4			38	21.2	
9.2		46	18	14.7		5.3		56	11	6.3	A	9.2		47	56	21.9		9.5		54	25	9.3		8.2		49	17	11.8	A
9.2		48	49	54.1	B	9.5			42	17.7		9.5		50	6	42.2		9.5		56	30	5.5		7.0		50	12	47.6	F
9.4		49	15	58.6		9.5		59	5	31.4		8.7			38	6.2	A	7.5		58	18	46.2	A	6.7			54	18.2	A
9.5		50	21	9.8		9.3			23	57.5		9.5		51	26	2.4		9.4			46	50.1		9.4		52	18	6.9	A
9.4			54	3.3	A	9.0			31	49.0		9.3		52	21	23.2		9.5			52	5.5		9.1		53	4	26.1	A
9.4		56	17	50.9		9.4	19	0	36	31.5		9.5		57	39	24.5		9.4	21	0	29	50.6		9.5		55	20	13.8	

1101—1130					1131—1160					1161—1190					1191—1220					1221—1251				
	21ᵘ—22ᵘ		+71°			22ᵘ		+71°			22ᵘ—23ᵘ		+71°			23ᵘ		+71°			23ᵘ		+71°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.5	21	55 54	0.0		9.4	22	22 19	49.5		9.0	22	39 34	8.0		9.5	23	8 58	58.3		9.4	23	36 8	37.1	
9.1		56 47	43.6	A	9.5		43	2.7		9.3		47	7.5		9.4		10 15	22.5		9.5		38	47.7	
9.5		59 10	6.4		9.2		45	46.0		9.5		40 10	45.0		9.5		11 16	31.8		9.0		37 17	20.5	
8.5		53	21.3		9.4		23 17	39.2		9.2		42 10	49.2		9.5		25	25.3		9.4		30	16.4	
8.5	22	0 21	58.9	A	9.2		25	33.5		8.0		45 38	22.8	A	9.2		12 23	4.0		9.2		39 20	36.5	A
9.1		56	6.9		9.3		24 3	38.7	B	8.2		56	49.1	A	9.0		31	26.7		9.3		27	8.7	
7.5		4 1	29.8	A	9.0		9	40.7	A	9.3		46 23	19.4	A	9.5		14 36	35.0		9.3		41 43	47.0	
8.7		27	28.8	A	9.5		32	1.1		9.0		47 5	2.7	A	9.3		46	53.8	A	9.4		43 3	47.5	
7.2		29	39.7	A	8.2		40	30.4	B	8.6		48 3	49.7	A	9.2		17 40	36.6	B	8.0		30	0.0	A
9.4		6 24	16.3		9.4		51	22.5		9.2		35	43.4		9.3		19 34	8.2	A	9.5		44 30	0.4	
5.2		7 1	37.7	A	9.5		26 7	6.6		9.3		50 36	21.6		8.5		20 23	49.4		9.5		36	56.3	
6.7		26	24.3	A	9.5		27 49	29.9		8.0		54	49.3	F	9.5		21 1	47.5		9.3		45 21	57.3	
9.1		9 48	23.7	A	9.2		29 16	58.7	A	8.1		51 10	14.0	A	8.0		22 50	26.5	A	9.5		34	28.3	
9.0		10 36	19.5	A	9.4		26	52.0		9.5		52 53	27.8		9.4		24 6	24.5	A	9.3		47	56.8	
8.8		47	23.1	A	9.3		30 35	42.7		9.3		57	19.7		9.5		21	27.2		8.8		47 0	56.8	A
8.0		59	45.0	A	9.4		48	31.7		9.4		54 32	54.3	A	8.0		25 16	10.8	J	9.3		17	14.2	
9.2		11 37	41.2	A	9.5		31 33	27.9		7.8		45	55.8	A	9.5		38	52.3		9.3		29	14.9	
8.5		12 14	54.4	A	9.5		51	27.3		9.4		55 8	8.7	B	6.8		26 22	12.2	F	8.8		48 9	39.5	
9.5		29	13.5		9.4		51	51.5		9.4		14	11.4		9.3		24	19.5		8.7		49 32	18.2	
9.2		14 15	13.6	B	9.1		32 2	37.2	A	9.5		56 41	38.0		9.3		27 21	31.0		8.8		47	29.5	
9.4		31	15.1		9.5		38	14.0		7.8		57 27	56.3	A	9.0		28 21	57.3	A	9.5		50 58	40.1	
9.0		42	0.5		9.5		54	43.7		9.5		59 34	7.7		9.0		40	55.3	A	8.5		51 19	46.5	
8.9		15 33	5.6		9.4		33 59	16.4	A	9.4	23	1 16	16.0		9.4		52	58.5	A	9.5		52 25	46.0	A
9.5		17 53	4.6		9.5		34 11	43.7		9.5		58	23.9		9.5		57	13.2		8.0		43	48.4	A
9.5		18 6	52.5		9.3		35 31	4.7		9.3		3 13	6.1		9.5		29 50	27.3		8.8		53 3	35.5	A
9.4		44	30.1	B	9.0		37 4	42.2	A	9.5		32	32.8		9.5		31 35	51.7		6.9		54 18	26.0	A
9.0		19 16	26.7	A	9.2		9	47.5	A	9.5		46	47.0		9.4		41	59.7		9.5		38	34.7	
9.5		27	19.7		8.0		21	59.7	A	9.4		8 11	39.0		8.2		32 55	8.7	A	9.5		55 20	57.1	
9.3		21 1	38.4		9.5		59	48.5		9.5		32	21.9		9.3		33 57	17.0		9.0		57 8	9.8	A
8.5		34	18.5	A	9.4		38 20	41.2	A	9.2		37	7.2	A	9.0		34 30	2.9	A	7.8		59 31	57.9	A
																				9.3		39	13.8	A

Zone +72°

1—20					21—40					41—60					61—80					81—100				
	0ᵘ		+72°			0ᵘ		+72°			0ᵘ		+72°			0ᵘ—1ᵘ		+72°			1ᵘ		+72°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.0	0	1 1	13.0	A	9.5	0	16 28	10.1		9.5	0	39 17	10.0		9.5	0	58 56	50.0		8.2	1	23 37	43.6	A
9.0		10	27.7		9.4		17 38	39.9		8.4		40 32	47.2	A	9.5	1	0 29	42.1		9.5		57	11.1	
9.2		13	0.7	A	9.1		18 8	40.0	A	7.5		41 23	45.7	A	9.3		41	20.5		9.5		24 15	51.7	
9.5		2 12	41.0		9.4		20	35.7		9.2		43 1	58.4	A	9.3		3 44	12.7		8.8		25 35	36.1	A
9.4		36	46.0		9.5		19 50	53.8		8.7		45 43	21.6	A	9.5		4 5	59.6		9.5		26 11	58.5	
9.5		41	48.7		9.3		54	34.0		9.1		44	22.4	B	9.5		7 37	24.5		5.2		27 1	17.2	A
9.5		47	46.1		9.4		20 46	29.8		9.2		55	7.4		8.5		45	38.2	A	9.0		30	2.0	
9.4		5 11	28.7	A	9.5		21 15	28.1		9.5		46 13	39.8		6.7		8 2	6.4	A	9.5		54	58.5	
9.4		6 1	40.0		8.9		48	42.0	A	9.3		22	24.5		6.7		13 16	4.9	A	9.3		28 36	17.8	
8.5		12	35.6	A	9.3		22 52	56.2		9.5		47 20	36.4		9.5		14 34	58.8		9.5		30 9	13.9	
9.5		50	10.1		9.5		24 7	13.2		9.5		48 11	59.0		9.5		16 52	18.1		9.5		16	7.0	
8.5		8 38	32.2	A	9.3		29	14.2	B	8.4		49 33	9.9		9.4		17 12	45.1		9.5		44	47.7	
9.3		9 11	0.8		9.5		25 37	22.8		8.8		38	1.0	A	9.5		18 3	12.2		9.5		31 4	38.3	
8.8		35	49.4	A	9.5		27 18	30.2		9.5		52	34.0		8.7		31	59.1	B	9.5		35 19	44.8	
7.0		10 9	8.1	A	6.7		28 50	6.1	A	8.3		51 1	53.7	A	7.9		19 52	7.5	B	9.2		40	7.5	
9.0		58	34.2	A	9.5		29 39	49.8		9.1		54	51.4	A	8.0		21 6	9.8	A	9.3		36 42	8.9	
7.2		11 10	18.5	A	9.5		35 57	47.9		9.0		53 5	34.8		9.2		22 30	6.4	B	9.0		37 7	52.9	
9.5		13 48	52.8		7.7		37 42	17.7	B	8.6		35	4.9	B	9.3		38	7.5		9.5		45	38.9	
8.6		59	26.3	B	8.9		38 16	48.5		9.4		55 58	4.4		8.3		52	35.0	A	8.9		38 7	24.[illegible]	
9.3		15 11	30.3		9.4		57	38.1		9.2		57 58	14.7		9.5		56	28.9		9.5		39 4	59.	

101—160				161—220				221—280				281—340				341—400			
	1ᵘ—2ᵘ		+72°		3ᵘ—4ᵘ		+72°		4ᵘ—5ᵘ		+72°		5ᵘ—6ᵘ		+72°		6ᵘ—7ᵘ		+72°
m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′		m	u ′ ″	′	
9.3	1 39 52	41.3		9.3	3 0 25	57.5		9.5	4 9 19	9.0		8.2	5 22 30	6.4	A	7.7	6 41 50	7.1	A
9.5	40 51	20.8		9.2	50	15.4		9.5	10 17	0.2		9.2	25 8	11.3		9.5	42 11	49.3	
9.5	41 22	37.5		9.5	2 20	46.3		9.0	14 19	23.7		8.4	29	12.7	B	9.5	44 46	28.3	
9.5	36	47.7		8.7	44	21.2	B	8.4	15 0	55.4	A	9.5	26 29	35.8		9.3	46 17	9.5	
9.2	55	14.9	A	9.4	47	22.3		9.1	30	14.0		9.5	29 31	1.9		9.0	47 25	51.7	8
9.1	42 17	24.6		8.0	3 12	15.1	A	8.7	56	19.3	B	9.3	32 20	17.7		9.3	49 54	22.8	
8.7	43 12	10.9	A	9.3	6 1	54.1		6.0	16 48	12.6	A	9.5	34 34	52.0		6.8	52 5	10.1	A
9.3	17	49.7		9.2	7 6	17.4		8.5	18 11	37.5	B	7.7	41	25.1	B	9.5	53 49	16.5	
9.2	32	58.8		9.5	37	54.9	B	9.5	13	55.5		9.3	42	33.4		9.5	54 20	48.8	A
9.0	44 54	30.0	A	9.2	8 8	17.9		9.0	22 32	16.1	A	9.5	35 7	58.2		7.5	55 7	53.3	A
9.0	46 2	12.8		9.5	9 48	36.9		9.5	23 53	52.9		9.0	58	11.7	A	9.5	20	41.4	A
7.2	33	27.1	A	7.1	10 24	40.5	A	8.0	25 23	48.0	A	9.5	59	20.1		6.4	57 4	2.6	G
9.5	47 45	55.2		8.0	13 50	3.5	A	8.0	36	41.2	A	9.3	36 55	6.9	A	9.5	59 29	19.4	
8.2	48 28	41.9	A	9.5	14 21	21.3		8.9	26 22	18.1	s	9.3	41 0	29.9		9.0	44	44.1	A
9.5	45	8.4		9.4	16 29	28.6		8.6	27 10	31.3	A	9.5	45 16	22.0		9.0	7 1 13	31.1	A
8.7	57 46	33.4	A	9.2	17 46	13.8		8.5	30 13	51.7	A	8.6	46 7	28.0		9.5	57	55.5	
9.5	59 41	14.8		9.2	18 11	35.5	s	9.3	32 34	35.8		9.4	47 6	54.5		8.6	2 32	39.4	A
9.5	2 0 13	18.8		6.7	19 25	50.5	A	8.5	58	38.8	B	8.4	48 24	24.0	A	9.0	3 9	3.2	A
9.5	42	19.8		8.6	20 25	50.5	A	9.4	59	12.4		8.0	59	36.8	A	9.5	55	54.2	
8.5	2 52	55.6	A	9.5	56	59.4		9.4	35 14	4.0		9.3	50 32	53.5	A	9.5	4 15	19.4	
8.0	4 28	38.8	A	9.0	21 28	36.5		9.2	39	45.8		8.4	49	18.3	A	9.5	5 48	42.9	
9.2	51	28.7		9.5	23 47	38.3		8.0	36 42	48.0	A	9.5	52 43	23.8		9.0	52	38.1	A
9.1	5 12	56.5	A	9.5	25 44	9.9		9.4	59	50.6	B	9.0	54 50	28.8	B	9.2	10 1	0.1	A
8.5	9 32	46.1	A	8.2	27 8	56.2	A	9.5	38 1	12.4		9.5	56 0	1.4		9.4	14	58.5	
8.3	50	49.0	A	9.5	16	27.6		9.5	39 14	41.9		9.3	57 24	20.2		9.3	14 33	3.2	A
9.0	10 5	25.9	A	9.5	38	13.8		9.0	44 48	19.2	A	8.3	25	51.1	A	8.0	58	6.2	A
9.5	46	22.1	A	8.0	30 5	33.5	A	8.9	45 26	13.8	A	9.5	59 15	36.3		8.8	17 40	44.4	F
7.5	11 14	50.3	A	9.5	31 47	36.5		8.4	30	11.4	A	9.5	6 1 39	37.8	A	9.3	18 5	3.1	B
9.5	12 22	19.1		9.2	32 13	58.7		9.1	46 54	52.8		9.1	2 34	1.4	A	9.5	19 46	29.2	
9.4	14 34	6.6		9.0	34 24	55.5		9.5	48 10	48.2		9.5	3 8	51.4		9.5	20 35	39.4	
9.3	44	22.7		9.5	35 6	3.7	B	9.1	50 34	46.7		6.3	11	12.2	A	9.5	23 56	9.5	
9.5	15 6	18.0		8.0	36 35	45.3	s	8.4	44	43.3	A	9.5	6 39	6.9		8.6	24 7	40.4	A
8.8	13	8.8	A	9.5	37 52	42.8	B	8.5	53	12.8	A	9.3	7 21	51.6	B	9.0	47	17.0	A
9.4	47	25.8		9.0	38 18	20.3		9.1	51 11	2.6	A	8.8	8 37	39.2	A	9.5	25 2	5.2	
9.5	16 52	56.0		9.2	39 26	3.6		8.9	20	16.3	A	9.5	10 16	28.9	A	9.5	47	49.8	
9.0	17 43	14.1	A	8.0	33	10.9	A	8.5	53 27	50.2	A	8.8	44	47.5	A	9.5	28 31	16.5	
8.3	18 59	8.8	A	9.5	42	39.5		9.3	54 28	55.7		8.2	12 22	5.8	B	9.5	29 4	33.6	
9.5	20 30	36.7		8.9	41 29	32.5		7.9	59	32.9	B	9.5	14 12	39.8		9.5	31 19	53.2	
9.5	23 36	42.4		7.0	59	17.4	A	9.5	56 26	1.1		9.5	15 53	48.5		9.5	32 0	3.1	
5.0	24 22	9.8	G	8.8	42 3	56.4	A	9.5	50	9.4		9.3	16 59	32.4		9.5	53	59.2	
8.6	34	57.0	B	9.5	44 32	9.5		9.2	58 42	34.5		9.5	18 43	58.4		9.2	35 56	51.7	A
8.3	27 12	9.4	B	8.3	41	53.8	A	9.0	56	53.7		7.5	19 12	7.0	B	7.2	36 20	9.5	A
9.4	28 46	12.1		9.5	45 40	11.5		9.5	59 29	10.4		8.8	52	30.4		9.4	37	38.1	
9.5	29 23	54.9		8.0	46 57	24.2	A	9.5	5 1 35	25.1	B	8.7	20 21	58.0		9.5	38 20	28.3	
7.5	36 2	18.2	A	9.5	48 43	40.5		8.5	5 45	7.7	B	9.5	21 46	36.8		7.0	40 18	13.4	A
7.5	38 26	40.4	A	9.5	55 17	54.7		9.5	6 26	28.5		9.5	49	7.4		7.3	58	3.4	A
8.9	39 57	25.6	A	9.5	56 35	24.2		9.0	47	0.6		9.4	23 47	17.8	A	8.7	41 39	50.8	A
9.4	40 13	51.1		8.5	58 50	39.3	B	9.5	8 14	32.5		9.4	25 53	29.9	A	9.5	42 11	40.2	
6.5	53	47.7	A	9.5	56	31.4		9.5	10 0	17.3	A	9.5	26 34	34.5	A	9.5	43 34	37.9	
9.3	41 11	42.8	A	9.4	59 13	44.8		9.1	39	31.5	A	9.5	29 29	43.7		9.5	47 18	37.6	A
9.0	28	57.5	A	9.4	23	41.3		9.4	11 42	8.0	A	8.5	37	51.5	B	9.5	48 26	30.4	
8.2	49	18.2	A	9.5	4 0 42	18.3		9.5	12 22	9.2	B	9.5	48	43.9	B	9.4	49 27	50.7	
7.0	44 0	4.6	A	8.5	1 2	3.4	B	9.5	15 6	37.8		9.2	30 17	58.0	A	9.5	38	46.1	
7.8	48 11	1.5	A	9.3	39	1.2		9.4	17 0	8.4		9.5	53	6.4		7.3	57	11.4	A
9.0	49 15	50.7		9.4	42	5.8		9.5	59	20.2		9.2	31 46	50.1	A	8.0	52 11	21.0	A
8.4	52 18	15.3	A	8.6	57	6.3	B	9.4	18 50	57.2		9.4	32 54	43.2	A	9.5	54	48.5	
7.7	33	25.2	A	7.5	2 8	2.3	B	9.3	19 2	55.2		9.5	36 58	37.1		9.3	53 30	11.6	A
9.3	55 58	2.6		9.1	28	50.8		9.5	15	0.9		8.0	38 52	3.1	A	9.3	47	54.1	
9.2	57 31	18.3		9.5	5 56	20.8		9.5	45	3.8		9.0	41 4	49.6		9.4	54 40	53.4	A
9.4	33	54.8		7.9	7 27	42.9	A	9.5	20 26	21.1	B	9.5	43	42.4		9.5	55 40	7.8	

401—460						461—529						521—580						581—640						641—700					
	7ᵘ—9ᵘ			+72°			9ᵘ—11ᵘ			+72°			11ᵘ—12ᵘ			+72°			12ᵘ—14ᵘ			+72°			14ᵘ—15ᵘ			+72°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
8.1	7	56	49	28.0	B	9.4	9	20	32	12.1	B	8.9	11	2	23	21.9	A	9.0	12	39	42	55.1	B	9.5	14	20	32	44.7	A
9.5			50	6.8		6.0		21	9	50.4	A	8.5		3	8	23.8	A	9.5		43	9	21.2		9.3		23	42	11.3	A
9.0		59	18	51.5		9.3		23	26	23.5	A	9.0		4	5	17.3	B	8.3			20	56.6	A	9.2		24	8	59.7	
9.5			57	23.4		7.3			39	42.7	A	9.0			36	33.8	B	9.5		44	14	21.2	A	9.3		27	16	26.0	
8.8	8	1	4	24.9		7.7		27	20	23.5	A	9.5			38	11.2		8.4		45	22	16.3	A	8.3		28	38	54.1	B
9.0		3	9	40.7		5.3		29	32	55.0	A	7.0		5	21	48.4	A	9.5		46	7	16.3		9.0		29	51	53.4	B
9.2		4	19	21.0	A	9.4		30	20	41.3	A	8.8		6	34	7.6	A	9.5		47	1	51.7		9.0		30	53	4.4	A
9.5			36	40.7		9.5			55	58.3		9.1		8	14	47.4	A	7.8			32	21.2	F	9.0		32	1	21.6	A
6.2			38	50.9	A	8.6		31	58	4.9	A	9.4			46	30.7		9.3			36	31.0		8.2			7	12.3	A
8.7			38	12.6	A	9.5		36	4	12.7		9.5		10	28	13.1		9.5		48	26	0.2		7.3		38	8	54.4	A
9.4			40	33.8		9.5		37	46	49.3		9.4		11	17	51.9	B	8.9			28	32.0		9.2		42	29	0.5	
9.5			48	51.0	A	9.0		39	47	4.9	A	9.5		12	1	50.9		9.0		49	35	9.5	A	6.8		45	9	34.3	G
9.5		5	50	34.3		7.1		41	11	21.1	A	8.0			14	31.7	A	9.5		51	0	55.0		7.5		46	53	12.6	F
9.5		9	40	5.8		9.0		44	0	5.4	A	9.4		16	35	1.7		8.9		54	16	37.4	A	9.5		47	35	5.4	
9.5		11	56	28.4		9.5			40	29.5	A	9.5		20	10	55.5		9.5			54	25.6	A	9.4		48	54	13.7	
9.5		14	59	37.7		8.0		50	43	3.4	A	9.3		21	29	40.5		9.5		57	1	53.4	A	9.5		49	30	9.3	A
8.5			59	3.3		9.5		54	8	29.5		9.0		22	17	15.4		9.3			3	9.5	B	9.0			42	25.7	B
9.0		15	23	51.0		8.9		55	27	53.7	A	9.5		25	7	30.6		9.3			17	7.5	B	9.5		51	53	49.7	
9.4			28	0.5		7.5		56	53	23.0	A	8.9		26	44	51.8	A	7.7		58	10	30.5	A	9.5			57	15.5	
7.5			43	47.0	F	9.0			55	42.7		9.5		30	35	40.3		7.0	13	2	36	10.5	A	9.1		52	44	15.9	A
9.5		17	32	2.8		9.5		58	51	36.8		9.5		32	17	2.1		9.3		3	0	1.1	A	8.3		53	34	1.3	A
9.4		19	3	22.4	A	9.0	10	0	56	42.7	A	9.2		34	20	10.4		9.4			22	1.1	A	9.5		56	42	41.0	
7.8			27	30.4	A	9.5		1	4	36.9		9.1			56	54.7		9.5		5	25	12.3	A	9.1	15	0	0	0.3	
8.9		20	51	0.4	A	9.0		9	53	39.4	A	9.4		35	6	33.5		9.1		7	17	6.9	A	6.3			18	19.4	G
8.1		25	35	46.0	A	9.5		10	55	47.8		8.8		37	39	53.1	A	9.0		9	6	18.5	A	9.1			48	52.2	A
9.4		31	37	46.0		8.4		11	1	53.6	A	9.4		40	19	1.5		9.2		11	32	54.1		9.5			49	58.5	
6.8			47	55.1	F	9.3			27	28.1		9.3		41	45	1.1		9.5		12	20	17.7	A	9.4		4	25	10.1	
8.7		33	0	27.4	A	9.5		12	20	24.1		8.8		43	12	35.4	A	7.8		13	23	0.1	A	9.0			40	18.1	A
7.8			44	33.2	A	8.5			47	13.3	A	8.6			53	46.7	A	9.4			36	29.1	B	9.5		5	25	9.2	
9.5		35	31	4.8		9.0		13	7	12.1	A	7.1		46	16	43.2	A	9.5		15	28	40.3		7.0			39	26.3	A
9.2		37	38	58.1		9.5		18	8	26.6		8.0			28	57.0	A	9.2		16	33	59.7	A	7.7		8	38	54.5	F
9.5		39	0	55.9		9.3		20	3	16.3		9.5		47	54	40.8	A	8.5			57	1.5	A	8.9		9	30	59.8	S
9.5		42	26	17.1		9.4		24	3	24.1		9.5		49	48	59.6		7.5		17	47	38.3	A	8.3			53	16.9	A
9.5			40	43.5		9.5			39	27.6		8.0		52	1	23.2	B	9.1			50	51.1		8.6		11	29	21.4	A
9.5		44	36	28.4		9.5		26	8	51.7		9.5			16	39.4		8.7		19	3	26.0	A	8.0		13	49	36.6	A
9.1			50	8.8		9.0		28	57	35.0	A	9.3		54	27	0.3	B	8.6		22	40	59.8	A	9.0		14	34	58.8	A
9.5		46	7	50.0		9.5		31	17	53.1		8.9		59	27	35.0	A	9.5		23	38	28.0		8.0		15	7	16.5	A
9.3			59	17.9	B	9.0		32	12	35.0		8.3	12	0	40	33.5	A	9.5		24	47	4.4		5.5		17	14	19.9	A
7.8		49	54	16.6	A	9.5		33	54	50.2		9.5		5	56	10.0	A	9.5		26	56	7.1	A	2.8		21	1	19.9	A
9.5		54	26	37.2	A	9.4		34	14	16.8		9.3		13	3	42.3	A	9.5		27	15	9.4	A	9.0		24	3	20.1	
7.7			30	52.6	A	8.9		35	28	42.9		9.5		14	30	14.4	A	7.7		28	1	32.5	A	9.5		25	20	18.6	
8.3		56	1	49.5	A	8.0		36	54	25.2	A	9.5			52	0.2		9.0			24	27.6	A	8.8		27	48	33.8	A
9.5		58	20	28.4		9.5		37	43	27.0		9.0		15	12	2.6	A	9.3			54	2.6	A	9.0		29	5	22.0	A
6.3		59	49	15.1	A	9.2		39	27	45.9		9.2			26	39.9	A	9.4		37	6	42.7		8.8		32	16	24.0	A
9.5	9	0	47	36.4		9.5		42	48	37.9	B	6.5		20	6	44.3	A	9.2			24	29.0	A	9.5		33	45	2.0	
9.5		1	52	41.3		9.5		43	5	53.2		9.5			52	2.6		9.4			48	28.1		9.5		36	52	11.7	
9.1		2	3	13.8	A	9.1		46	9	1.3		9.5		22	43	6.6		9.5		39	1	12.4		8.5			58	0.4	A
9.2			40	5.5	B	9.5		49	55	35.1		9.5		23	13	18.3		8.1		46	34	49.1	B	9.5		39	31	11.6	
8.5		3	47	47.8	A	9.5		52	25	37.6		7.0		24	41	7.0	A	9.3		47	45	34.5	A	9.0			36	10.0	B
8.3		5	42	15.4	A	9.5		53	33	14.0		7.6		25	46	59.0	A	9.4		48	25	38.9	A	9.0		42	0	36.3	
9.0		7	11	50.7	A	9.5		54	57	20.9		9.3			56	56.0	B	8.5		52	15	37.9	A	9.5		44	2	23.0	
9.1			38	49.2	A	9.5		55	30	59.2		9.2		26	23	20.7	A	9.5		55	22	36.0		9.0		45	10	20.3	
9.5		11	34	10.0		9.5			39	43.9		9.5		27	42	40.9	A	9.4		58	24	7.4		9.4			19	1[illegible]	
8.5		13	29	33.0	A	8.2		57	35	54.4	B	9.4			50	1.1	A	9.5	14	5	24	27.1		9.5			37	[illegible]	
9.1			50	2.6	A	7.0		58	28	43.4	A	8.1		32	26	55.5	B	9.5		11	7	6.8		9.5		46	17		
7.8		16	13	57.1	A	8.1			59	48.9	A	9.2		36	23	19.8	A	8.6		15	14	10.8	A	8.5		47	[illegible]		
9.3		17	25	52.7		8.9		59	34	16.0	A	9.5		37	14	54.0	A	9.4		18	55	44.1	A	9.0		49			
9.4			57	47.2	B	9.0			35	13.5	A	8.0		38	17	51.7	A	9.2		19	55	6.4	A	9.5					
7.2		18	6	44.7	A	9.1	11	1	8	23.4	A	8.1			59	53.7	B	9.5		20	2	30.3	A	9.4		51			
9.1			28	16.1		9.3			24	38.1	A	9.5		39	29	42.8	A	9.1			21	6.4	A	9.5		[illegible]			

701—760					761—820					821—880					881—940					941—1000				
	15ᵘ—16ᵘ		+72°			17ᵘ—18ᵘ		+72°			18ᵘ—19ᵘ		+72°			19ᵘ—20ᵘ		+72°			20ᵘ—21ᵘ		+72°	
m	ᵘ ′	″	′		m	ᵘ ′	″	′		m	ᵘ ′	″	′		m	ᵘ ′	″	′		m	ᵘ ′	″	′	
9.5	15 53	27	18.5		9.0	17 1	53	20.3	A	9.0	18 7	5	14.6	A	9.4	19 12	14	52.5		8.2	20 12	12	14.2	A
8.3	55	39	42.6	A	9.4	2	53	14.0	A	9.3		33	42.1		9.4	34		46.2	B	9.5	13	48	8.4	
7.0	57	7	49.5	A	9.4	3	53	59.8	A	8.9	8	7	3.1	A	9.1	15	32	38.3		6.8	14	33	26.0	G
9.4	59	43	27.0		9.5	4	3	47.0	A	9.1		25	4.0		8.9	17	53	39.9	B	9.3		52	0.5	
9.3	16 0	26	59.3	A	8.9	7	59	12.0	A	9.0	10	10	27.0	B	9.3	18	40	54.9		7.0	15	56	8.0	G
9.3	1	41	19.0	A	9.5	9	32	53.9		9.4		11	30.2		9.1	19	48	35.2		8.0	18	8	27.0	A
9.5	3	16	11.2		9.5		46	57.8		9.4		26	59.9	A	9.0	20	27	27.4	A	9.5		35	0.0	
8.6		47	56.6	B	7.3	10	53	18.8	F	9.5	11	3	35.2		9.1	21	7	0.2	B	9.5	20	30	44.1	
9.4	5	0	51.8	B	9.4	11	11	33.3		7.8		27	6.9	A	9.4	22	39	52.1		7.9	23	27	40.6	A
9.5		6	57.0	B	8.7		34	2.8	B	9.5	12	52	20.3		9.4	23	0	49.6	B	8.2		27	45.5	B
8.0		12	21.5	A	9.2		51	9.3		9.4	13	18	22.3	B	8.0	26	1	18.0	A	9.0	26	3	27.5	
9.0	7	30	16.3		9.1	13	16	49.7		9.5	15	41	55.1		9.5		50	52.8		9.0		34	45.1	A
9.5	8	4	8.1	B	9.3		21	37.6		9.1	16	29	27.5		9.5	27	18	20.0		8.3	27	37	20.1	A
9.4		22	2.0		8.3	16	18	55.0	A	9.5	17	15	38.4		9.5	28	41	49.4		9.1		47	9.3	
9.5	9	41	21.1		8.6		19	58.7	A	9.5	19	19	2.5		7.5	29	45	10.6	A	8.5	28	9	15.2	A
9.1		49	29.0		9.4		21	34.1		9.5	20	55	17.3		9.5	30	22	34.2		8.8	29	27	45.1	A
9.0	10	43	57.0	S	9.3		21	39.7	B	9.5	21	4	21.7		9.5		30	46.1		6.3	30	36	2.9	A
7.0	12	23	45.6	F	9.5	18	5	48.0		9.5	23	15	13.8		9.4	31	18	26.9		9.5	34	22	8.8	
9.3	14	4	15.2		9.3		34	18.5		3.8		42	40.3	S	9.3		35	3.6		9.4		48	1.8	B
8.0	15	0	8.3	A	9.0	20	11	15.1		9.3		48	36.5		9.3		44	15.9	B	8.4	35	25	58.7	
9.5	18	23	28.9		8.5	21	25	36.2	A	9.0	26	11	50.0	A	9.5		54	51.8		8.0	39	0	12.5	A
8.0	21	19	44.6	A	8.3	22	47	43.0	A	9.0		24	31.6	A	9.0	32	12	30.8		7.0	41	50	26.8	A
9.5		53	45.6		9.2	23	17	26.3	A	9.0		31	15.8		9.4	37	40	43.6		9.2	42	10	9.7	A
9.0	22	3	57.6	A	9.1		37	26.8	B	9.4	27	9	38.9	A	8.6		50	48.4		8.5	46	46	46.9	
8.0		58	38.3	A	9.5		51	36.3		9.2	28	31	3.0	A	9.5	38	13	54.8		9.5	48	24	18.3	
9.0	23	21	2.4	A	9.4	25	58	7.8	A	9.0	29	14	18.7	A	8.8	42	48	35.8		8.5	50	22	1.9	A
9.0		40	27.0		9.1	27	42	57.3		8.5	32	20	41.8	A	9.0	44	10	18.2		7.5	51	25	24.0	A
9.5	24	40	37.4		9.2		46	22.4		7.7	34	6	57.3	A	8.5		10	6.9	A	7.5		56	30.4	A
9.5	25	41	45.7		8.5	28	10	58.0	A	8.7		53	12.3	L	8.3		38	10.2	A	9.0	53	56	2.4	A
9.3	26	15	30.9		9.5	29	22	26.9		9.5	36	12	54.5		9.5	46	49	50.4		9.5	54	33	52.4	
9.5	27	46	27.0		7.5		27	55.6	L	9.5		32	40.3		7.0	48	28	5.8	A	9.5	57	1	11.3	
9.4	28	23	21.2	A	9.5		34	27.4		6.8		52	16.3	A	8.5	49	43	57.1	B	9.3	59	0	28.4	
9.3	33	42	19.4	B	9.1		45	13.1		8.3	37	28	24.6	B	9.5		54	42.0		9.5	21 0	35	8.2	
6.3		47	55.2	A	9.4	30	35	20.9		8.3		40	16.3	A	8.7	50	12	1.0	A	8.9	1	4	24.5	A
9.0		47	45.5	A	9.5		41	40.0		7.0		45	9.1	A	9.4	51	9	46.7		9.5	4	20	56.5	
8.9	34	15	48.7	A	9.2	31	18	23.4	B	9.4		49	2.0		9.1		25	55.2		8.3		55	36.3	A
8.4	35	49	16.3	B	9.5	32	59	21.4		6.5	38	29	14.8	A	9.3	52	14	48.2		9.2	9	31	43.0	B
9.5	36	3	13.1		9.4	37	27	59.8		8.5	39	30	8.5	A	9.5		15	49.6		9.3	11	3	57.7	
9.5		24	51.3		7.3	39	20	8.3	J	8.0	42	0	50.1	A	9.5		43	48.0		9.0	12	37	38.2	A
8.5	38	32	39.5	A	6.0		55	32.2	A	9.5	43	30	21.1		9.5	54	18	48.5		7.3	13	50	33.9	A
9.5	39	18	21.4		9.5	40	49	12.6		9.4	45	9	55.5		9.5		23	14.2		8.3	14	2	48.4	A
9.3		32	22.4	B	9.5	43	51	42.5		8.5	47	54	53.3	B	9.5		54	39.7		8.7	15	57	53.8	A
9.4		48	26.6	B	8.2		58	28.3	A	9.5	50	3	37.4		9.5		59	55.8		9.3	18	58	7.8	
9.5		57	13.0		4.8	44	31	13.0	A	8.8		53	48.5		9.5	56	18	37.4		8.4	19	58	32.7	B
7.0	43	9	56.5	A	6.2		33	14.0	A	8.0	51	0	15.5	B	9.5		56	52.0		9.5	21	7	20.5	
9.4		24	31.2		9.5	46	41	7.3		9.5		13	29.4		8.0	58	19	32.4	A	8.8	25	24	25.0	A
9.4		26	43.0		7.5	47	15	41.0	L	9.5	52	38	38.8		9.5	20 1	47	41.6		9.5	26	31	11.8	
9.2	44	18	44.5	A	8.5	48	10	2.7	A	9.5	53	40	47.7		8.9	2	45	29.4	A	9.0	28	42	43.7	A
9.3	45	10	55.9		9.5		23	51.6	B	9.5	54	39	53.3		9.5	3	17	25.5		9.5		47	32.4	
9.3	46	25	1.9		7.8	50	28	41.5	A	9.0	55	3	56.3	B	9.3		33	35.4	A	9.4	29	10	43.7	
8.2		34	0.6	B	9.1	51	29	5.3	A	8.9	58	18	57.8	B	9.4	4	15	12.7		7.5		44	50.1	A
9.2	48	53	46.6	A	9.4		58	59.5		9.5		37	31.4		9.2		55	26.1		8.8	30	31	25.5	A
9.4	49	42	45.0		9.2	52	20	50.2	A	9.4		50	17.6		8.0	6	10	33.3	A	7.5	32	3	18.5	A
8.5	50	6	12.1	A	8.5	53	47	30.3	A	9.2	59	46	50.8	B	7.5		13	20.6	A	8.9		19	35.3	A
9.5	51	31	19.9		9.2		58	52.0	A	9.3	19 1	18	27.9		9.4		33	52.3	B	9.5	33	1	6.8	
9.5	55	2	13.2		8.5	55	7	42.6	A	9.5	9	36	0.9		9.3	7	1	46.8		9.5	35	21	10.3	
9.2		31	41.1		9.5	57	37	25.9		8.0	10	5	1.6	B	9.3	9	16	32.4		9.5		38	13.7	
8.7		45	41.9	B	6.0		43	0.2	A	8.8		20	37.5		9.4	10	0	40.0		9.3	38	32	5.8	A
9.4	56	30	10.0		9.3	18 0	54	15.1		9.5		38	30.4		9.5		2	47.1		9.3	46	2	3.8	A
9.4		34	0.2		8.8	2	26	24.4		9.3	11	56	55.0	B	9.4	12	10	4.4		9.5		27	21.4	

1001—1029								1030—1057								1058—1085								1086—1113								1114—1141							
	21ᵘ—22ᵘ			+72°					22ᵘ			+72°					22ᵘ			+72°					23ᵘ			+72°					23ᵘ			+72°			
m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′			
9.5	21	48	41	29.8				9.5	22	17	52	8.2				9.4	22	39	47	4.2	B			9.5	23	3	5	6.1				9.5	23	35	42	54.7			
8.6		49	46	9.1				9.5		18	39	55.3				9.4		41	51	53.4				9.5		5	4	37.5				9.5		36	5	50.5			
6.5		51	8	59.5	A			9.0		19	6	38.1	A			9.5		51	59.7					9.5		6	4	4.6				9.0		31	15.9	A			
9.5		52	45	25.8				9.2		20	59	10.1				9.5		42	3	12.1				9.5		7	5	44.0				8.5		37	7	33.2	A		
9.5		53	16	17.0				9.2		21	3	4.3				9.1		43	26	36.9	A			9.4			42	21.6				9.5		39	2	31.2			
9.5			21	53.6				9.4			35	39.6	A			9.5		44	14	40.9				9.5			53	14.3				9.5			25	47.1			
9.2		54	39	49.7	A			8.0		22	22	52.8	F			9.3			18	10.3	B			8.6		8	15	26.2	A			9.5			36	35.5			
9.5		55	26	17.0				7.9		23	46	50.1	B			9.4			32	49.2				8.8			45	5.2				9.5		40	15	56.2			
5.0		57	10	28.2	A			9.5		24	3	39.6				9.3		45	3	50.4	B			9.4		10	45	56.2				9.4		43	21	50.0			
9.5			22	7.2				9.2			7	13.6				9.5			26	26.1				9.3		11	53	27.7	A			8.8		47	33	10.0	A		
9.1		58	22	13.1	A			9.5		25	15	54.3				9.5		46	46	43.3				6.8		12	41	53.6	A			9.5			35	5.7			
9.5			29	21.9				9.5		26	4	36.2				9.4			58	52.6				9.5		13	20	19.8				9.5		48	20	34.3			
9.3		59	44	0.3				9.1			14	16.5	A			9.5		48	29	27.1				9.5			49	58.6				9.4			52	0.2	A		
9.2	22	1	49	47.2	A			9.3			58	37.1				9.5			40	42.8				9.5		14	21	30.7	B			7.8		50	14	3.2	F		
9.0			56	28.8	A			9.5		27	31	44.5				9.1		49	28	5.0				9.5		16	2	28.1	B			9.5			25	33.6			
8.5		5	15	14.5	A			8.5		28	41	6.7	A			8.5		51	16	3.6	S			9.4		19	59	49.3				9.4		51	0	7.1			
7.2			41	4.3	A			9.0			58	35.1				9.4			22	34.1				9.3		21	21	7.1				9.5			7	42.4			
9.1		6	31	10.6				8.2		29	3	26.3	A			9.4			30	6.5				9.0		24	24	0.7				9.0			26	50.6	A		
8.9			51	42.6				9.5			22	33.8				7.5			39	3.6	S			9.4			26	57.9				9.3		52	8	43.0	A		
8.4		7	12	40.6	B			5.5		32	14	54.1	A			9.0		53	10	9.7	A			9.5		25	39	27.0				9.5		53	6	16.4			
9.5		9	57	7.2				7.0			25	7.7	A			9.2			13	49.0				9.5			48	31.8				8.8		54	10	29.1	A		
6.5		10	14	36.1	S			8.7			31	6.9	A			6.6			18	20.8	A			8.8			50	28.8	B			6.5			19	47.9	A		
9.5			23	8.1				9.5		34	41	12.1				9.4		55	40	6.7				9.4		26	33	58.5	B			7.0		55	58	21.4	A		
9.5		13	13	11.6				8.8		35	5	13.1	A			9.5		57	48	19.3				7.5		28	0	7.5	A			9.3		57	13	24.8	A		
8.2			38	52.8	A			9.5		36	55	11.6				9.0			48	35.0	A			9.5		32	1	7.1				9.5			30	57.6			
9.4		14	55	31.7	B			7.3		37	37	29.8	A			9.5		59	22	37.9	B			9.0			18	49.7	A			9.5		58	26	46.5			
9.5		15	4	35.4				8.8		39	20	59.3	A			9.3			25	52.7				9.2			19	8.5				8.0		59	36	24.2	A		
9.5		16	39	13.1				9.1			32	48.3				9.5			33	36.1				9.5		34	44	23.8				9.5			55	58.3			
9.1			48	19.9	A																																		

Zone +73°

1—20								21—40								41—60								61—80								81—100							
	0ᵘ			+73°					0ᵘ			+73°					0ᵘ—1ᵘ			+73°					1ᵘ			+73°					1ᵘ			+73°			
m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′				m	ᵘ	′	″	′			
9.4	0	0	3	5.4				9.5	0	22	2	38.2				9.5	0	44	15	15.4				7.0	1	5	49	13.9	A			6.5	1	25	33	32.7	A		
7.0		1	3	25.8	A			8.8		24	52	40.1				9.0			23	20.3				9.2		7	6	48.8				9.1			50	4.2			
9.5			45	59.3				9.5		25	50	6.7				9.5			50	10.4				9.4			37	56.9				9.0		27	7	37.3	A		
7.0		3	35	39.7	A			9.5		26	16	13.7				9.5			52	52.2				9.5		8	19	21.8				8.3			26	48.1	A		
9.5		7	48	28.4				9.2		29	33	47.0				9.1		45	24	56.2				9.5		9	47	38.9				9.5		28	48	33.4			
9.1		10	22	0.4	A			9.1		30	16	58.3				9.5			36	1.7				6.8		10	23	49.2	A			9.5		29	7	44.0			
9.5			59	51.0				9.1		31	6	58.8				8.0		49	31	11.4	A			8.9		11	8	47.7	A			9.5			10	37.5			
9.5		11	25	10.2				9.5		32	15	59.8				9.5		51	8	37.1				9.2		12	33	18.5				9.3		30	21	3.0			
9.0			35	30.1	A			9.0			31	54.9				8.9		52	56	8.5				9.3		13	20	3.7				9.0			25	49.0	A		
9.5		12	27	15.8				8.0		33	39	16.1	A			8.3		53	13	23.2	G			9.4			41	5.1				9.1			32	50.6	A		
9.5			28	18.1				9.3		34	19	39.7				6.8		54	29	36.0	A			7.8		14	15	21.9	A			9.5		31	23	40.2			
9.3			34	43.9	A			8.4		35	13	42.6	A			9.3		55	49	30.3	B			9.3		16	54	14.1				6.8			37	51.5	A		
9.3		13	9	32.9				9.2			16	41.7	A			8.5		56	23	51.2				9.2		17	12	14.6				9.5		32	32	40.3			
9.5			36	20.0				9.5		36	57	48.9				9.5			43	1.1				9.4			25	54.8				9.4		33	5	47.6			
9.5		15	20	40.2				9.3		38	5	13.7				9.0			44	45.9				7.5			30	27.3	A			9.5			16	39.8			
9.1			39	1.2	A			9.0			8	42.1	A			9.3		57	46	3.9				9.0			58	28.8	A			9.0			58	48.0			
9.5		16	12	22.1				9.5		39	46	15.9				9.5	1	0	38	15.9				9.5		18	43	0.2				9.3		35	4	28.0			
9.2		18	37	38.2	A			9.1		41	31	42.4	A			8.4			41	29.4	A			8.5		21	41	52.3	A			9.5		37	25	44.			
9.4		19	41	28.4				9.4			55	41.4	A			7.5			2	48	9.1	A		9.5		22	35	18.0				9.4		41	3	43			
9.2		20	26	36.7	A			7.5		43	29	32.6	A			8.5			5	45	11.9	A		9.5		24	49	45.5				8.9		43	38	1			

101—160																													
	1u—2u			+73°																									
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.4	1	43	58	27.5		9.5	2	45	16	10.8		9.4	4	5	7	44.7		9.1	5	4	45	41.2		9.2	6	20	59	28.6	
9.3		45	54	14.3	B	8.5		47	2	11.3	A	8.9		6	16	33.4		9.3		5	21	8.2		9.2		22	26	13.4	
9.5		46	1	13.1		9.5			18	7.9		9.0			37	23.1		8.5			24	38.5	s	9.4			28	1.6	
8.3		47	0	16.2	A	9.3		50	10	37.4		8.6		7	20	58.0	A	9.3			32	37.7		9.1		26	41	13.4	
9.1			44	48.5	A	7.4			12	21.6	A	9.5		8	34	41.3		6.5		6	47	33.2	B	9.5		28	0	49.2	
9.3			47	5.4		9.3			30	16.7	B	9.5			35	44.7		9.0		7	33	55.2		9.2			28	55.1	
9.1		48	19	15.7	A	9.5		51	24	37.9		9.3		10	44	30.9	B	9.5		8	46	31.7		8.5		30	33	45.3	F
6.2		50	30	8.3	A	5.2		56	18	49.6	G	9.3		11	7	38.4		9.5			49	38.1		9.3		31	51	28.6	
9.5			50	2.5		8.4		57	6	38.4	A	8.8			10	20.2		8.0		9	3	21.9	B	9.5		33	22	58.0	
9.4		51	11	27.7		7.1			50	44.6	A	9.3			47	57.0	A	9.5		11	9	22.9		9.4		34	56	56.0	
9.5		52	2	24.7		7.0		58	40	40.5	A	8.0		12	52	37.4	A	9.5		12	11	51.8		9.3		35	12	41.4	
7.3			56	52.0	A	6.8		59	40	18.6	A	8.4		13	42	16.8	A	9.3			29	0.0		9.2		36	51	28.6	
9.0		53	46	27.5		8.9	3	0	38	28.5	A	9.3		15	45	1.7	B	9.4		17	38	37.7		8.4			59	33.5	F
9.2		54	14	19.1	A	9.5		1	6	1.5		9.1		16	35	52.5		9.0		21	39	54.2	A	9.5		38	10	27.2	B
9.5			55	19.1		9.5		3	22	6.8		9.1		18	15	5.7		9.2		22	27	19.8	A	9.5		39	23	48.3	
9.1		55	22	14.2	A	9.4			25	30.6		8.6		19	38	21.4	B	9.2		24	7	41.3	A	9.5			58	6.9	B
9.0		56	8	56.5		9.2			56	33.2	B	8.5		20	5	49.6	G	9.2			17	26.2	A	9.4		42	14	1.8	B
9.5		58	7	40.8		9.5		4	29	31.0		9.5			22	11.3		6.8			27	54.1	A	9.0		43	7	49.6	
9.5			10	30.8		7.4		5	32	9.5	A	9.5		21	6	32.5		9.1		27	2	12.1	A	8.3		45	50	0.8	A
9.5		59	52	52.0		6.9		8	5	38.2	A	9.5		23	20	51.2		9.4		33	16	48.7		7.5		46	32	37.3	B
6.5	2	0	6	19.6	A	9.5			40	31.9		9.5			43	47.3		9.5		34	57	2.2	B	9.5		49	14	10.0	
9.0		2	27	27.9		9.3		10	57	40.2		9.3		25	30	45.8		8.2		38	49	9.5	A	9.5			53	53.1	
9.5		3	8	33.3		9.5		11	20	27.5		9.5		27	36	4.3		9.5		41	59	49.7		9.5		51	3	27.2	
9.4			26	54.0		9.1		14	55	3.3		8.5			42	57.1	A	9.5		43	12	15.9		9.0			43	16.4	
9.5		6	59	59.8		9.5		18	8	40.2		9.5		29	38	32.1		8.4		45	28	3.9	A	9.5		56	26	53.1	
8.8		7	33	9.2	A	9.5			19	5.6		9.5			42	40.4		8.8			28	55.0	A	7.5		58	10	33.1	F
9.0			36	0.7		9.4		19	25	43.4	B	9.4		30	24	6.5		8.8			31	51.8	A	9.5	7	1	26	18.3	
9.3		8	9	46.6		8.4		20	29	10.5	A	9.5			30	52.8		8.9			32	8.8	A	9.0		2	18	48.1	B
8.8		9	55	26.1	S	9.4		21	23	12.7		9.0			42	10.9		9.0			36	59.0	A	9.1			25	42.1	
9.5		10	9	28.3		8.8		22	37	58.3	A	9.1		33	8	21.9		9.5		46	10	24.2		9.5			51	8.0	
7.9			11	8.5	A	9.0		23	16	41.2		9.3			43	47.9		7.3			35	59.7	A	8.8		3	8	26.2	
9.4		11	23	37.1		9.5		26	17	21.1		9.2			58	48.5	B	9.4		48	1	42.8	A	9.4		5	37	46.8	
9.5			41	53.1		9.4		29	37	47.2	B	9.5		34	34	23.8		9.5			59	52.1		8.7			49	17.8	A
9.4		12	6	57.7		9.5			42	16.2		9.1		36	49	51.7		9.5		50	1	56.1		9.0		8	2	27.6	A
9.5			24	45.4		9.2		30	47	34.8		9.3		37	9	2.0		9.5		52	59	9.5		7.2		9	3	20.3	A
7.8			57	55.0	A	9.4		32	45	16.7		9.5		38	55	1.5		9.5		53	45	25.4		7.8			10	20.3	A
9.5		13	2	20.6		9.4			49	39.8	B	9.2		39	1	35.9	B	9.5		54	22	18.4		9.5		13	34	25.0	
9.4			40	53.7		9.5		33	27	26.1		9.5			3	28.6		9.0		57	7	35.5		9.4		15	9	26.0	B
6.9		14	11	3.0	A	9.0		34	7	27.1	B	9.5		40	44	31.2		9.5		58	37	14.4		9.5			13	45.9	
9.5		15	32	35.3		9.4		35	24	18.7		9.5		41	2	12.0		9.5		59	10	9.5		8.3		18	15	32.2	A
9.5			45	19.6		9.3			49	3.2	B	9.5			41	10.7		9.1			18	44.3	A	7.5		20	55	53.7	A
8.3		16	16	58.9	A	9.3		36	29	6.3		9.4		44	15	35.2		7.7	6	0	25	0.3	A	8.9		21	5	39.1	A
9.5		17	19	21.1		9.5		38	32	3.5		9.5		45	57	8.9		9.5			40	50.6		9.5		25	10	10.0	
8.5			45	59.9	s	6.5		39	48	38.4	G	6.3		46	12	32.7	A	9.4		1	29	56.1		9.1		28	55	38.5	A
9.5		21	21	9.4		9.5		41	33	24.1		6.3			24	49.4	A	9.5		2	25	20.8		9.2		30	10	42.9	A
9.1		22	3	6.6		9.0		43	10	7.3	A	9.3		47	26	57.4	B	9.1		5	36	58.1	B	9.5		34	17	36.5	
9.2			29	9.4		9.5			15	31.5		9.4			37	38.4	B	9.4		6	58	23.7		8.4		36	53	6.0	B
8.8			44	37.7		9.5		47	13	38.4		9.5			53	49.3	B	7.5		7	32	29.6	B	9.4		37	23	30.1	A
9.5			46	26.3		8.8		49	16	19.8		8.5		48	15	52.4	A	8.5		8	15	49.2		9.0			58	35.1	A
9.3		24	23	1.5		6.4		50	8	34.4	s	9.5		49	24	4.0		8.8		9	13	55.0	B	9.4		39	21	42.4	
9.3		25	17	59.2		9.5			22	48.7		8.0		50	5	21.9	A	8.5			52	37.4		9.1		40	30	31.2	A
9.5		27	4	14.0		6.5		52	37	10.2	A	9.5			31	42.5		9.1		10	18	41.8		9.4		44	9	1.2	
9.4			8	52.8	A	9.5		54	36	48.6		9.4			43	13.8	B	9.4			56	20.7		9.0			10	32.4	A
9.5		29	58	49.4		9.5			36	22.2		5.5		54	9	45.0	A	8.8		11	33	2.9		9.0		46	12	8.4	A
9.5		30	25	18.2		8.3			43	58.5	A	8.9		55	22	18.0		8.5			35	4.9		8.3		47	7	2.4	A
9.5			35	4.1		9.4		59	15	43.2		9.3		56	35	48.5		8.6		12	9	32.8		9.0		48	33	32.4	
9.5		36	30	14.7		9.0	4	0	47	17.8		9.4		59	29	23.4		9.5		15	49	35.0		9.0		49	25	58.3	F
8.2		38	56	10.0	B	9.4		2	0	47.9	B	9.1	5	0	10	41.0	A	9.5		17	7	19.3		9.4		53	39	8.1	
8.2		40	36	42.8	B	8.9		3	9	33.9	A	9.0			18	38.6	A	9.5		19	5	38.5		9.5			44	5.7	
9.4		41	26	59.7		8.8		4	55	13.2		5.8			25	5.6	A	6.0			35	47.2	F	9.4		56	31	1.4	

401—460					461—520					521—580					581—640					641—700				
	7ʰ—9ʰ		+73°			9ʰ—11ʰ		+73°			11ʰ—12ʰ		+73°			12ʰ—14ʰ		+73°			14ʰ—15ʰ		+73°	
m	h m s		′		m	h m s		′		m	h m s		′		m	h m s		′		m	h m s		′	
8.6	7	57	58	7.3	9.2	9	10	18	29.8	B	9.4	11	8	58	4.4	R	8.1	12	59	20	11.0	A	9.4	14	42	43	31.9	
9.5		58	29	10.1	9.5			28	7.0		8.0		14	40	25.5	A	9.5			47	38.3		9.1		43	52	22.7	B
8.5	8	0	31	9.9	9.0		11	29	53.1	F	9.5		16	5	29.0		6.0	13	0	19	48.4	A	8.7		44	55	33.0	
9.3		1	36	1.1	9.3		14	32	35.4	A	8.8		17	17	10.0	A	9.4			25	46.9		9.5		46	29	21.8	
9.5			53	31.8	8.7		15	11	11.9	A	9.5		19	36	21.7		9.0		4	20	33.3	A	8.7		48	47	21.6	
8.5		3	27	47.0	A	9.2		16	2	31.9	A	9.0		23	5	20.6		9.1		6	47	6.9	A	8.0		50	14	38.0	F
8.5			35	52.8	A	8.1		19	38	39.3	A	9.5		24	38	16.2		6.8		9	24	34.5	A	9.5		54	48	55.8	
9.2		6	28	6.3	A	9.5		20	11	14.2		8.7		29	5	41.8	A	9.5			26	56.5		8.6		55	50	22.4	A
9.5			50	47.0		9.2		22	51	5.9		9.2			11	51.1		9.5		11	24	11.4		9.5		56	24	4.5	A
9.4		8	34	42.0		6.5		23	59	43.5	A	9.0			48	17.6	A	9.5		20	8	34.8		9.2			42	30.8	A
9.1			46	27.8	A	7.0		25	44	23.4		8.5		31	0	21.1	A	7.3		21	59	1.8	B	8.8		57	30	2.8	A
9.5		10	18	49.4		9.4		28	37	58.2	A	6.8		36	19	57.4	A	6.0		22	26	8.9	A	8.3		59	31	59.7	B
9.5		11	0	11.0		9.4		29	5	10.1	A	9.5		37	12	4.0		9.5		26	18	55.0		9.5			31	25.3	
9.4			53	29.3	A	9.5		30	12	34.6		9.5			59	2.9		9.5		27	16	20.2		8.0	15	1	18	36.2	A
9.5		12	1	35.7		9.5		33	47	52.8		9.5		39	13	36.8		8.0		29	49	47.7	A	8.5			50	38.2	A
7.2		15	57	10.2	F	9.5		34	50	32.7		9.3		47	17	58.5		8.7		32	28	22.6	B	9.2		3	51	38.2	
9.5		16	6	14.6		9.5		40	35	31.2		8.0			17	11.7	A	9.5		33	13	35.0		8.7		4	26	38.2	A
9.4		17	7	29.8		6.3		45	20	33.2	A	9.4			46	16.4	A	9.5		34	44	43.7		9.0		6	32	22.3	
9.4			18	32.2		9.4			38	19.8	B	9.4		48	29	22.1		8.6		35	1	30.0	A	9.5			38	1.8	
7.3		18	35	56.3	A	9.3		46	8	23.8	A	9.5			32	33.8	B	9.5		41	18	5.4		8.7		7	0	32.2	
9.4		21	20	10.2	A	8.2		49	3	6.6	A	8.5		50	3	47.6	A	9.4		42	28	39.4		9.5			38	40.6	
9.5			35	22.9		9.2		52	36	30.2	A	9.5		54	27	41.2		9.5		43	43	54.5		9.5		8	23	54.8	
9.5		22	5	20.0		9.5			46	54.2		9.1			51	10.4	S	9.5		47	44	0.5		9.1		10	25	22.9	
8.5		23	26	43.5	A	7.8		54	53	18.5	A	9.3		55	17	42.6	A	9.1		48	23	30.5	A	8.0		12	35	23.4	J
9.1		24	28	10.6		9.5		55	21	23.8		9.4	12	0	8	36.7	A	9.5		49	16	40.3		9.4		13	14	17.5	
9.3			46	13.4		9.5		57	43	27.8		9.4		3	42	13.2	A	9.5		50	37	25.0		8.4			44	40.2	A
9.5		25	35	4.7		8.7		58	39	43.5	S	9.1		5	40	6.2	A	9.0		53	36	45.3	B	8.7		15	16	52.4	B
6.5		26	59	39.6	A	9.2	10	1	31	41.1	A	9.5		7	27	40.7		8.2		54	18	58.9	A	9.5			51	50.9	
9.5		29	44	39.6		6.5		5	42	47.9	A	6.5		8	50	21.5	G	8.5			56	34.3	B	9.0			56	7.2	A
7.0		30	5	48.4	A	9.0		6	55	6.0	A	9.0		13	18	48.5	A	9.5		56	43	36.9		9.3		18	21	0.8	A
9.2			49	4.7		7.6		7	7	9.6	A	8.7		17	3	7.9	A	9.5		57	34	50.1		9.2		22	1	28.3	
9.5		31	8	41.6		9.5		11	57	32.6		8.7		18	28	10.4	A	9.0		58	33	29.5	A	7.2			45	58.3	G
9.5		32	50	35.2	B	9.2		13	24	45.0		9.3			32	41.4	B	9.5		59	44	23.1		8.3		23	26	24.8	B
8.4		33	31	12.1	B	9.2		14	37	1.0		9.5		21	17	1.3		8.0			44	50.1	A	8.3		24	0	57.3	F
9.3		34	42	44.5	A	9.1		18	7	43.5	A	8.3		23	59	28.4	A	8.5	14	0	21	38.8	A	8.3			2	28.4	B
9.5		37	53	43.5	A	9.0			51	58.7	A	9.1		24	33	19.9	B	7.8		1	51	38.8	A	8.6			29	18.2	B
9.1		41	22	25.8	B	9.5		21	22	2.0		9.3			48	35.6		9.1		3	45	36.4	A	8.5		25	0	55.4	B
8.0		43	33	38.3	s	9.5		22	50	10.4	B	9.1		25	58	35.8	B	9.5		5	40	30.0		8.5		26	5	21.1	B
9.2		45	48	29.0		9.5		26	24	30.4	B	7.2		27	28	17.1	A	9.0		7	56	31.0		8.6		29	38	3.0	B
9.5		47	32	45.2		9.5		27	5	35.4		9.1		30	53	51.3	B	8.8		8	46	17.9		7.5		31	56	25.4	s
9.3			59	6.3	A	9.5		28	13	41.1		7.0		33	45	47.6	A	9.3		9	53	40.8		9.3		34	29	42.5	
9.5		48	45	45.6		9.3		30	5	7.1	A	9.4		34	5	5.2	A	9.5		12	6	18.8		9.5		37	11	59.7	
8.7		50	5	9.1	A	9.3			23	55.2		9.3			22	7.5	A	9.5		16	1	18.9		9.5			36	52.3	
9.3		51	33	45.5	B	6.8		34	56	3.1	A	9.5		36	6	27.9		9.4			5	34.0	A	9.5		38	16	22.9	
9.3			53	47.8	A	9.2		42	36	55.4	A	9.4			17	59.3		9.5		18	43	47.3		9.0			29	11.1	
9.5		54	27	3.3		8.8			50	10.3	A	9.3			31	44.6	A	9.4		22	25	39.0	A	9.5		40	45	26.8	
9.5		55	24	59.8		8.8		44	6	24.5	B	9.5		37	37	20.1		9.4			35	10.4	B	9.5			56	36.2	
8.5		56	11	34.8	A	9.0			10	13.3	B	9.0		39	43	13.6	A	9.4		25	20	26.2	A	9.1		43	33	22.8	
9.5		58	21	8.2		9.2		45	1	1.8		8.6		40	12	37.8	A	9.5			38	9.7		8.5			50	56.3	A
9.1	9	0	31	48.1	A	9.2		46	47	55.4		9.5		41	2	40.7	A	9.5		26	50	52.6		9.4		44	38	22.1	
9.2		1	1	30.2	B	9.5		48	24	25.0		9.4		42	21	51.0	A	8.3		27	39	41.9	S	9.0			50	20.8	B
6.0			12	32.2	A	9.5		49	36	31.5	A	9.2			50	17.9	B	9.4		28	21	16.4		9.5		45	8	25.5	
9.0			28	49.0	A	9.5		50	44	1.2		9.1		46	18	19.1		9.5		29	3	23.1		9.5		47	40		
9.2		4	1	37.4		8.5		53	2	52.5	A	9.5			27	22.9		8.9		31	43	7.7	B	8.4		48	[illegible]		
9.5		5	39	49.0		9.5		55	29	53.0		8.6		48	26	50.0	A	9.2		33	42	59.9	A	9.4		49			
9.1		7	0	28.0		9.5		57	10	21.6		8.7		49	0	33.2	B	9.5			59	21.2		9.5					
9.1		8	26	35.3	A	9.2			43	43.2	A	9.5		53	4	11.7		9.5		34	55	43.3	A	9.5					
9.5		9	52	13.2		8.5	11	1	36	53.5	A	9.5			13	44.6	A	9.4		38	32	10.2	A	7.8					
9.4		10	4	47.1		9.3			54	27.5	A	8.0		57	35	15.1	A	9.1			59	44.3	A	9.2					
9.1			16	53.6		9.0		7	58	8.8	B	9.5		58	7	4.8	A	9.0		42	7	28.4	B	9.2					

701—760					761—820					821—880					881—940					941—1000				
	15u—17u			+73°		17u—18u			+73°		18u—19u			+73°		19u—21u			+73°		21u—22u			+73°
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	
9.5	15	57	51	9.5	9.5	17	12	22	11.8	9.5	18	24	49	16.3	9.0	19	50	21	13.6	9.3	21	39	15	23.5	A
9.5		58	27	38.2	9.5			46	30.0	8.0		25	15	56.9	A	8.3		51	2	58.1	A	9.3		40	33	28.9	A
9.4	16	2	37	55.7	A	9.5		13	32	52.5	9.3		33	26.8	A	9.2		49	47.0	A	9.4		42	3	46.1	A
9.5		4	15	54.8		9.3		17	32	35.4	9.2		27	32.0	B	9.5		52	0	51.3		9.4		44	9	11.8	A
9.4		5	8	0.8		9.1		18	56	8.4	A	9.5		28	3	44.0	A	9.5		53	33	30.2		8.5		51	54.6	A
9.4			11	5.5	B	9.5		23	37	48.6		9.5		39	28.3	A	9.5		55	14	25.9		9.3		47	46	55.6	B
6.7		6	5	31.9	F	8.1			56	8.3	B	9.5		30	27	32.2	9.5		56	11	0.0		9.0		49	17	31.0	L
9.1		9	11	38.0	B	9.5		24	35	36.8		9.5			52	37.7	9.4		57	12	32.2		9.5		52	34	29.0	
9.5			13	59.2		9.5			42	24.0		8.5		31	39	39.7	A	9.4			23	1.0		9.5		54	12	49.6	
9.5		12	37	41.1		9.3		26	0	0.2		9.3		34	57	26.8	B	8.5		58	30	13.6	A	9.5			49	5.5	
9.5		13	42	59.2		9.5		27	9	44.7		7.0		38	58	8.7	A	9.0	20		0	13	50.3	A	9.3		56	47	51.8	B
8.7		16	6	38.1	A	8.5			24	3.9	L	9.4		41	14	39.2	B	9.3			27	54.8		9.5			57	6.0	
6.2			59	46.0	A	9.2		28	3	8.8		9.3			46	39.1	B	9.3			1	0	44.0		9.5		57	14	9.9	
9.5		17	49	37.7	B	8.4			40	20.1		9.4		44	41	46.1	B	8.3			3	47	49.8	A	9.2	22	0	14	56.1	A
9.5		18	59	37.7	B	8.8		30	3	37.8		5.3		49	26	54.3	G	9.4			5	47	30.8	B	9.4			21	4.6	A
9.5		20	23	26.9		8.8		31	15	26.0		9.5			27	35.6		8.2			6	24	55.3	A	9.2			30	10.5	A
8.5		22	36	31.3		9.5			24	1.0		9.1		50	28	54.9	B	6.7				24	28.7	A	7.8			46	6.8	A
9.5		25	10	7.2		8.9		36	19	18.6	A	9.5		51	39	22.8		8.3			7	2	2.7	A	8.7		1	3	8.0	A
8.5		28	11	50.9	A	9.4		37	54	5.8	B	9.5		52	16	37.7		8.3			9	27	4.0	A	9.0			5	43.5	A
9.1			29	36.4	B	9.5			54	1.8		9.0		53	13	55.8		8.0			11	27	57.7	A	9.5		4	6	57.0	
9.4			49	39.4		9.5		38	42	50.3	A	9.5		54	13	8.2		8.5			13	31	32.4	B	9.2			22	47.2	B
9.2		29	26	7.3		7.8			59	8.3	A	9.4		56	7	10.8	B	9.1			15	5	21.4		9.3			44	47.4	A
8.5		30	35	43.1	B	9.0		40	32	54.5	A	7.8			41	53.7	A	9.2			19	53	9.6	A	9.1		5	7	20.8	
9.0		31	30	13.0	B	9.5		41	33	35.7		9.5		59	47	16.5		9.4			22	32	54.6	B	9.3		6	9	55.3	
9.3			33	36.6		9.0		42	6	3.9	A	6.8	19	2	11	55.3	G	9.3			23	11	17.1		9.5		8	1	14.7	
8.3		32	1	14.7	B	8.2			52	0.3	A	9.5		5	51	28.8		9.2				18	18.9		9.4			25	15.8	B
9.0			56	35.2		8.0			59	2.5	A	9.5		6	4	59.9		9.4			24	7	47.4		9.5		9	25	19.3	
9.2		33	37	46.5		9.5		43	47	20.7		7.7			23	9.1	B	9.5			27	28	54.3		9.5		10	18	36.5	
9.0		34	49	54.8		9.3		44	46	52.5	A	9.5		7	0	59.2		9.3			29	10	19.4	A	8.5		13	18	34.2	A
8.8		35	29	14.0		9.5		45	23	40.8		9.5		8	9	28.4		9.5				21	5.7	A	8.5		14	20	22.4	A
9.2		38	37	4.7	A	7.3			30	31.0	L	9.5		9	5	51.8		9.3				23	55.8		9.5		17	23	26.3	
9.5		39	21	8.1		9.2		48	6	11.3		8.7		10	10	55.0		9.4			40	25	17.4	B	9.4			29	3.8	
8.0		41	0	36.2	A	9.3		49	42	19.8	B	8.6		11	9	23.6	B	9.2				42	0.7		9.1			50	53.8	A
8.8			17	51.3		9.5		50	42	20.0		8.2		15	31	37.7	A	9.5			41	37	13.4		9.1			56	6.6	
9.5		42	11	17.9	A	9.1			45	2.4		8.9		16	35	52.9	B	9.3			47	47	26.1		9.1			57	27.9	A
9.5			13	10.6	A	7.3			51	10.8	L	7.8		18	0	35.2	F	8.2			49	34	56.1	F	9.5		19	45	25.3	
9.4		43	31	39.6		9.5		52	26	13.3		4.4			19	4.9	A	9.2			51	38	26.1	A	9.5		20	6	25.3	
9.5		44	47	46.5	A	9.4		53	5	28.5		9.0			57	37.9	B	9.4			52	7	37.9		9.0		25	6	36.7	L
9.4		45	40	56.3		8.6			8	41.4	B	9.4		19	41	38.7		9.5			53	20	6.0		9.1			11	22.3	L
9.2		46	12	58.7	A	9.2			43	6.5		7.5		21	42	16.6	A	9.5			58	36	35.3		9.3		28	5	27.6	L
9.1			35	20.1	A	9.5			47	47.4		9.4		24	27	30.4		9.5			59	57	23.5		9.5			12	5.7	
8.5		47	49	4.4	A	8.9		57	10	18.7		9.5		27	28	51.0		7.5	21		0	11	42.7	L	7.5		29	40	19.3	A
9.4		49	45	36.2		7.8			17	8.4	L	7.5		29	30	3.4	A	9.2			5	43	39.2		9.5		32	30	10.0	
9.2		50	0	54.8	A	9.2			23	7.3		8.9		32	38	1.1		9.2			6	24	17.9	B	9.5		33	53	58.6	
9.5		52	16	15.0		9.4		58	40	24.1		8.8		34	40	57.0	F	8.6			8	48	7.2	B	8.3		35	3	44.5	
9.1		54	16	32.3		9.1		59	48	2.6		9.5		35	4	28.0		8.7			11	12	27.5	A	9.5			36	10.5	
9.2			52	1.4		9.5	18	0	9	46.6		9.1			38	19.6		9.1			12	37	41.2	A	8.7		36	49	37.9	A
8.5			56	32.7	G	9.4		1	35	54.5		9.5		36	17	11.8		9.4			15	26	44.9		9.2		37	36	13.5	
8.2		56	32	8.6	G	9.3		5	49	54.0		9.4			42	46.2		9.2			17	43	8.3		7.5		38	58	33.7	A
8.5			54	58.6	B	9.4		6	30	39.8		9.2			50	52.5		9.4			22	15	1.6		9.5		40	22	25.7	
6.0		59	11	19.3	A	9.3		7	8	42.0	B	8.7		37	5	58.4	F	8.8			23	4	19.0		7.3			46	40.9	A
9.5	17	0	28	20.0		8.5			47	16.2	A	8.7		39	47	11.4	F	8.8			25	42	2.0	A	9.5		41	5	0.8	
9.0		3	21	37.3	B	8.8		8	24	58.3	B	9.4		43	36	34.2		9.2			26	53	20.6	A	9.5			11	36.6	
7.0			28	23.8	B	9.1		9	17	38.3	A	9.5		44	11	29.7		9.5			29	25	8.8		7.3			56	47.7	A
7.2		4	23	30.7	B	8.8		14	49	58.2	A	9.4			17	13.6		9.5			30	10	31.9		9.5		42	21	57.7	
9.4		9	32	55.3		9.5		16	57	36.1		9.5		45	40	58.6		8.3				15	1.3	A	8.4		44	27	54.0	B
9.4			33	52.3	A	9.5		19	5	49.6	B	9.5		47	16	56.8		9.0			37	40	18.7		9.3		49	50	42.3	
9.5		10	12	35.2		9.5		21	21	9.3	B	9.2			32	41.5		9.5			38	6	40.2		7.5		50	1	50.1	L
7.8		12	3	19.5	F	9.5		22	7	13.0		9.3			44	53.5		8.9				14	57.4	A	9.1			6	46.2	L
9.5			8	39.2		9.5			7	34.1		8.9		49	19	58.7		9.5				56	46.6		9.5			50	24.6	

1001—1015					1016—1030					1031—1045					1046—1059					1060—1073				
	22ʰ—23ʰ			+73°		23ʰ			+73°		23ʰ			+73°		23ʰ			+73°		23ʰ			+73°
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′
8.8	22	54	57	7.4	9.5	23	4	34	33.8	B	9.5	23	15	26	27.0		9.3	23	33	7	52.0		9.5	23	40	35	37.3	
9.0		55	2	44.8	9.5			41	4.6	A	9.4			32	48.9	A	5.6			7	9.7	A	8.0		42	2	58.8	A
9.5			20	17.7	8.7		5	56	25.9	A	9.5		18	31	45.0		9.1		34	21	42.7		9.5		47	16	49.0	
9.0			39	51.1	L	9.5		7	37	6.3	9.5			38	13.2		8.7			49	44.0	B	7.0			53	36.2	A
9.2		58	31	17.7	A	9.0		8	23	51.9	7.5		21	57	19.0	A	9.0			51	20.5		9.5		48	57	5.2	
9.2			41	33.0	A	8.0			44	46.0	L	8.5		22	30	46.0	L	8.7			51	35.2		9.4		49	14	39.1	
8.0		59	20	41.7	A	9.5			51	50.3		8.0			58	30.3	A	8.0		35	45	19.0	A	8.2			17	19.0	A
9.2			30	16.7	A	6.2		9	30	27.3	G	8.5		23	3	11.0	A	9.0		36	40	11.2	A	8.0		50	27	3.4	A
9.3			43	41.9	A	9.3		12	24	48.5		9.5			4	46.1		9.4		37	2	54.6		7.5		52	2	59.6	A
9.5		23	0	42	35.9		9.5		13	55	32.3		9.0		24	1	4.2	A	9.3			36	28.0		9.2		55	14	15.2	
9.0			1	37	16.7	A	9.5		14	8	6.7	A	8.5			56	40.1	A	9.5		38	3	46.3		9.0		57	44	19.0	
7.8			2	36	56.9	A	7.8			17	7.8	A	8.0		27	26	25.4	A	9.5			12	49.3		9.5		58	9	44.1	
8.8			3	56	38.6	A	8.7			18	32.4	B	8.9		30	4	7.4	A	8.8			55	22.0	A	9.5			45	16.7	
9.5				59	32.3		8.5		15	7	16.0	A	9.4		32	15	47.5		9.2		39	2	18.1		9.5			54	46.1	
9.2			4	24	0.2	A	8.6			13	5.3	A	8.7			25	1.9	A												

Zone +74°

1—20					21—40					41—60					61—80					81—100				
	0ʰ			+74°		0ʰ			+74°		0ʰ—1ʰ			+74°		1ʰ			+74°		1ʰ			+74°
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′
9.5	0	1	11	55.3	9.5	0	27	5	57.8		8.0	0	47	44	41.5	A	9.5	1	12	34	16.8		9.3	1	35	46	47.6	
9.5		2	15	19.0	8.2			25	44.0	A	9.5		48	32	47.5		9.5		15	8	6.2		9.3		38	5	17.1	
9.0		3	17	43.5	A	9.5		28	9	48.0		9.5		47	43.7		9.4			50	3.2		9.2			7	19.5	
9.5		11	3	17.0		9.5			14	32.1		9.5		49	23	18.8		9.5		16	26	11.5		6.8		51	52.4	G
9.0			8	25.7	B	9.5		34	6	8.7		9.1		54	4	0.6		9.1		20	11	22.2	A	8.5		39	46	5.8	A
9.4			29	29.6	B	9.0		36	4	3.7	A	8.9			17	4.0		9.4			57	3.0		9.1		41	8	44.6	
9.2			46	32.8		5.5			11	11.6	A	9.4			43	41.0		9.1		21	50	34.0		6.5		44	51	37.0	A
8.5		14	7	15.5	A	9.2			47	4.8	A	9.5		56	21	44.0		9.3		25	8	16.5		9.0		46	8	45.6	A
9.5		15	15	15.5		5.8		38	11	3.7	A	9.1			55	25.3		9.3			24	7.6		9.2		48	17	37.8	
9.5		16	8	40.5		9.5		39	38	50.0		9.1		57	3	21.7		9.2			49	32.9		8.8			17	29.8	
9.2			19	2.8		9.5			42	50.2		9.5		58	35	35.8		8.9		26	22	30.9	A	6.5			49	47.2	A
9.5		18	34	31.7		9.2		40	5	56.2	B	9.5			41	15.3		9.1			54	37.0	A	9.0			52	45.8	B
9.5		20	38	9.1		8.9			46	48.5		9.0	1	1	18	41.0		8.5		27	58	49.0	A	9.3		51	36	43.1	
8.2		21	13	26.5	A	9.5		42	5	20.5		9.5		5	15	50.8		9.5		29	25	20.0		9.3		53	20	36.3	
9.5		22	35	26.2		9.2			15	34.3		9.5			25	2.0		9.3		30	53	29.8		7.5			51	10.2	A
9.3		23	49	14.2		9.5		43	10	57.8		8.6			44	26.7	A	8.0		31	18	0.8	A	9.3		54	4	19.7	
9.5			58	38.2		9.4			53	57.3		9.2		7	15	17.8		9.2		33	12	23.0		9.5		55	27	31.3	
9.1		24	3	48.0	A	9.5		45	4	23.4		8.8			20	15.8	A	8.4			51	5.3	A	9.5		56	33	15.1	
9.5			28	12.0		9.5			4	43.0		9.4		9	0	27.2		9.5		35	15	35.4		9.5		57	37	39.6	
8.5			58	40.6	A	8.6		47	22	30.3	A	9.4			39	52.8		9.2			45	22.7		9.4		58	40	54.9	

101—160					161—220					221—280					281—340					341—400				
	1ᵘ—3ᵘ		+74°			3ᵘ—4ᵘ		+74°			4ᵘ—6ᵘ		+74°			6ᵘ—7ᵘ		+74°			7ᵘ—9ᵘ		+74°	
m	u ′	″	′		m	u ′	″	′		m	u ′	″	′		m	u ′	″	′		m	u ′	″	′	
9.5	1 59	3	25.0		7.5	3 21	56	16.2	A	9.4	4 38	27	58.1		7.8	6 3	43	53.6	B	9.0	7 45	59	48.1	
9.5	2 0	17	53.9		7.9	22	23	47.9	A	9.4		39	56.9	B	9.5	5	31	34.2		9.4	47	33	16.0	B
9.5	2	11	33.2		9.0	23	35	49.1		8.8	39	7	56.8	B	9.4		40	1.3		9.5	48	3	16.7	
9.5		32	5.3		9.2		52	54.3		9.5		19	33.3		9.5	7	52	28.4		9.5		4	0.8	
9.2	6	27	21.6		9.5	24	31	7.2		9.5		58	2.1		9.1	8	51	47.6		9.5	49	19	1.8	
9.1	7	0	9.7	A	9.3		35	39.5		9.4	42	1	27.0		9.0	9	14	0.4		8.9	50	39	34.9	
9.2	10	4	39.2		8.8	28	7	52.9	B	9.5		24	25.8		9.3	15	24	22.2		8.7	53	0	28.5	
9.5	16	11	26.3		6.8		21	4.2	A	9.5	43	36	18.9		9.2	16	15	21.2		8.2		55	46.8	F
8.9		31	13.1	A	8.9		25	41.8		6.1	44	0	2.6	G	9.3		21	19.0		9.4	54	34	59.6	
8.3	20	27	34.9	B	9.5		51	55.9		9.5	45	13	21.9		8.8	17	12	23.6	B	8.5	58	49	55.2	B
7.5	23	15	54.1	F	9.2	29	0	54.3	B	9.5	47	15	19.9		9.5	19	25	48.1		8.2	59	4	8.4	B
7.5		18	44.3	F	9.0		21	35.0		9.0		25	11.5		9.5	22	6	13.7		9.5	8 0	31	27.2	
9.5	24	25	40.3		9.4	33	6	48.3		9.5		31	57.0		7.8		22	9.3	F	8.2	1	12	12.2	B
9.3	25	15	9.0		7.2	36	49	13.5	A	9.5	50	32	59.8		9.5		45	27.4		9.3	3	6	18.4	
9.5	27	37	2.2		9.1	38	20	19.5		9.5	52	24	38.4		8.8	23	13	36.0	A	9.5	4	48	41.8	
8.5	30	15	23.2	A	9.5	40	17	51.2		9.5	53	14	28.2		9.5	27	7	52.5		9.1		56	51.2	A
7.2	31	27	46.3	A	9.1	41	21	59.0		9.5		27	15.4		9.5	28	48	18.3		9.5	5	54	28.9	
9.3	34	27	25.5		9.4		38	56.6		7.2	58	49	20.9	A	9.5	31	51	41.7		9.5	6	5	48.8	
9.5	36	46	38.7		9.5		47	9.4		9.5	5 3	11	13.4		9.3	32	59	20.6		9.5		45	32.2	
7.3	37	34	7.7	A	9.1	45	8	53.2		9.3	8	26	38.2		9.2	33	0	3.4		8.5	7	25	52.6	A
8.7	39	33	42.9		8.9	46	39	50.8	B	7.1		49	23.8	A	9.5		4	2.5		8.8	8	18	28.8	A
9.4	40	17	27.8		9.5	47	9	30.6		7.1	9	51	10.1	A	9.4	34	21	28.4		9.5	10	20	29.7	
7.9		43	34.7	F	9.5	49	26	34.4		9.3	10	53	22.4	B	7.6		22	16.5	A	9.5		30	33.4	
9.4		48	5.9	B	7.8		30	46.8	G	8.9	12	41	17.4		9.4	36	25	57.5		9.5	11	48	33.2	
9.5	41	45	1.2		9.1		35	39.4		9.1	14	20	56.9	B	9.0	41	53	39.8	B	8.5	16	55	4.1	J
9.3	45	17	32.8		6.4		56	13.9	F	9.5	16	26	0.0	B	8.2		58	7.9	A	9.5	17	45	39.9	
9.3		22	41.3		9.5	53	8	11.2		9.4	17	6	21.8		9.2	42	6	52.0	B	9.5	18	40	7.2	
8.1	47	36	19.0	A	8.4		22	15.7	A	9.3		29	9.1		8.7	43	2	3.0	A	9.5	20	8	29.1	
9.0		42	0.4		9.5	54	4	28.2		7.0	18	10	11.5	G	9.5		31	41.8		8.6	22	18	8.6	A
9.5	48	20	36.7		9.5	55	34	30.5		7.5		30	34.7	J	9.5	47	0	34.2	A	6.4	23	30	8.0	A
7.2		33	34.2	B	9.5	58	13	2.8		9.0	19	59	33.3		8.5	48	51	40.0	A	9.5		36	17.4	
9.5	49	47	54.3		9.5		57	14.6		6.5	20	23	57.0	A	9.5	50	24	58.6		9.5	25	52	4.8	
9.0		59	55.0	B	9.2	59	45	5.3		8.9		57	30.3	B	9.5	51	19	18.8		9.0	26	29	7.6	A
9.5	52	40	6.8		8.2	4 1	6	15.7	G	8.6	21	20	10.2	A	9.2	55	19	10.9		8.5	28	31	49.7	B
9.3	54	21	11.2		8.0		42	15.3	G	9.5	22	26	37.1		9.4	56	39	7.4		9.3		45	27.8	
9.5	55	23	56.1		8.5	2	5	50.9	B	9.5	26	33	50.1		9.5	57	2	50.6		9.5	31	3	33.7	
8.1	56	15	2.4	B	8.9		33	18.1	G	7.2	27	21	32.1	A	9.4	58	37	22.8	B	9.5		58	45.3	
8.2		19	30.5	B	9.5	3	37	47.3		9.3	29	16	23.8		9.5		50	25.5		9.5	33	51	12.0	
9.5		19	54.7		9.5		56	13.1		8.9		40	7.8	A	9.5	7 1	50	9.9		7.5	35	4	16.9	F
8.0		47	22.6	B	8.8	4	12	1.4	A	8.9		51	38.3	A	8.8	4	34	23.3	F	9.5	36	6	12.5	
9.4	57	10	20.4		9.1	10	45	59.6	B	9.5	30	43	6.5		9.2	7	35	19.3		8.5	39	41	58.1	A
8.5		25	15.0	B	9.4	11	0	55.6		9.1	31	2	50.0		7.5		53	7.4	A	8.1	41	16	32.6	B
9.5	3 1	38	8.7		9.2		32	39.1		9.5	33	11	28.0		9.0	8	35	2.5	A	8.7	46	31	47.5	F
7.4	3	38	40.6	A	9.5	13	8	15.2		9.5	36	47	41.3		7.8	10	44	25.9	s	9.4	51	33	3.4	A
9.3	4	39	59.0		8.8		37	56.6	A	9.5	37	19	30.4		9.0	13	53	56.6		9.5	52	9	59.7	A
9.5	8	5	40.8		9.2	15	17	49.1	B	9.5	42	35	32.1		8.9	14	24	37.1		8.5	53	49	38.4	A
9.5		22	47.2		9.0	17	2	37.1		8.2	45	46	29.4	A	8.0	15	53	38.5	F	9.2	54	1	43.3	A
9.1	9	21	3.8		9.5		5	21.7		9.5	46	11	12.8		9.0		54	48.8		9.5	56	8	1.8	
9.3	11	40	29.4		9.5		17	26.0		9.0		56	22.8	A	9.5	18	20	11.8		9.5		43	32.1	
8.4		56	25.1	A	7.8	21	4	10.1	J	9.5	47	47	30.4		9.5	23	57	18.1		9.4	57	44	21.4	
7.9	13	26	44.3	A	9.5	25	3	49.8		9.2	50	30	21.6		9.0	25	26	41.3		9.3		55	22.8	B
9.0	14	1	50.2		9.4	27	15	31.2	B	9.3		59	25.8	A	9.5	27	17	40.8		9.2	9 4	33	3.8	
8.8	15	15	15.5	B	8.5		54	39.7	A	8.8	51	26	12.3	A	9.2	29	11	6.9		6.5		51	36.9	G
8.9	16	12	1.8		9.5	29	4	32.0		9.5	52	6	1.0		7.7		52	19.8	G	9.2	8	5	9.2	A
9.5	17	40	34.9		9.5		44	59.2		8.1		18	31.1	A	7.3	30	49	22.6	G	9.5	12	22	9.7	
9.4	19	20	11.2		9.5	31	36	27.7		9.0	55	52	1.4		8.8	32	12	50.2		9.5	13	15	54.8	
9.5		35	46.0	B	9.0	32	21	58.2	B	9.5	57	18	18.2		9.5	39	0	46.3		9.5	16	13	19.1	
8.2	20	20	8.0	A	9.2	35	26	10.5		9.4	58	28	53.7		5.2	42	45	17.9	A	9.2		27	3.4	
9.3		26	8.6	B	9.4	36	41	1.7		9.2	59	48	33.8		9.3	44	39	9.7		8.0		28	35.1	A
9.5		57	53.2		9.3		55	28.1		9.0	6 3	15	48.1		8.8		43	37.3		9.3	18	36	32.3	A

401—460						461—520						521—580						581—640						641—700					
	9ᵘ—11ᵘ			+74°			11ᵘ—13ᵘ			+74°			13ᵘ—14ᵘ			+74°			14ᵘ—15ᵘ			+74°			15ᵘ—17ᵘ			+74°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.5	9	20	36	18.4		9.5	11	15	58	46.2		7.7	13	3	48	7.1	A	9.0	14	26	13	58.1		9.2	15	57	53	39.5	
7.3		21	33	59.2	F	9.5		17	2	42.7		9.5			55	23.6		9.0		27	31	51.7	A	9.0		58	13	46.5	B
8.2		23	26	59.9	F	9.5		23	12	58.5		9.1		4	4	17.3	A	9.2		29	20	32.4		9.0			52	11.0	A
9.4		29	31	18.5		7.8		26	9	11.7	A	9.5		6	11	43.9	A	9.5		30	18	13.8		9.4		59	34	25.0	
8.6			33	41.9	A	9.5		28	21	36.5		8.5			11	44.4	A	9.4		31	5	40.9		9.0	16	0	54	47.2	
9.5		30	28	42.4		9.5			23	7.4	B	9.2		7	35	36.7	A	9.3		35	7	58.1		8.7		1	13	42.1	B
9.5			51	19.0	B	9.0		29	16	32.8	B	8.4			39	5.3	A	8.5			55	55.7	A	9.1			15	25.4	
9.3		32	26	0.6	A	9.5			27	2.9		9.5			44	53.3	B	9.5		37	2	8.4		8.8			20	29.6	
9.5			40	2.6		8.8		30	43	28.0	A	9.4		8	23	32.4	A	9.4		40	34	56.1		8.4			58	38.3	B
8.7		34	13	19.3	A	7.8		31	14	40.2	A	9.5		11	8	53.3	A	9.5		43	24	21.1		7.5		2	44	20.0	A
9.5			39	12.0		9.5		36	43	36.8		9.1			30	0.9	A	9.2		45	42	3.5	B	8.0		3	20	43.2	F
9.3		35	9	30.4		9.3		37	26	51.6		9.1		12	31	52.7	A	9.5		46	1	2.2		9.2		8	39	2.6	
9.0		45	0	33.3	A	9.0		44	26	9.2	A	9.5		13	29	17.1		9.0		47	17	7.8	B	9.2			40	17.0	
8.7			17	11.0	A	9.0		45	17	37.1	A	9.5		14	3	2.8	A	9.1			37	31.1	A	9.3		9	12	8.6	
9.3			17	20.3		7.5			21	5.8	A	9.0		16	9	12.2		2.1		51	12	45.2	A	9.0			35	19.1	A
9.5		46	48	9.5		6.7			49	33.5	A	9.5			33	27.5		9.3			22	1.6		8.7		10	59	18.8	A
9.0		47	6	51.7	A	8.8		46	48	35.3	A	9.5		17	53	16.1		8.9		55	24	22.4		9.3		12	18	55.4	
9.4			17	28.7		9.5		47	50	27.3	A	9.5		19	15	34.4		9.5		56	34	38.1		9.4		13	10	15.4	A
9.0			53	55.2	A	8.8		50	19	35.2	A	8.9		21	58	56.6	A	9.3		57	53	5.2	B	9.1		15	47	1.1	A
9.4		48	41	15.5	S	9.5		54	4	13.0		9.3		22	20	14.0	B	9.5		58	25	57.6		9.5			51	16.0	
9.2			56	9.9		9.5		55	38	52.8		8.3		23	46	59.1	A	9.5	15	4	31	46.3		9.5		20	41	24.6	
9.5		49	34	51.3	A	9.5		56	26	27.0		9.0		24	24	18.6	A	7.5		5	59	26.0	A	9.1		25	18	8.5	A
9.5			48	15.5	B	9.5		57	15	35.1		9.1		28	16	42.9	A	9.4		7	0	21.4		9.0			53	25.2	B
9.5		53	35	6.6		7.2			53	15.0	A	9.1		33	44	54.1		9.5		9	10	28.2		9.5		26	39	25.4	B
9.5		56	24	47.9		8.6		59	59	7.7	A	9.3		35	14	57.1		9.5		11	42	12.0		9.1		30	52	40.9	B
9.5			38	33.3		9.4	12	3	18	29.9		9.5		38	50	6.3		9.5		12	39	24.8		9.5		31	14	37.9	
7.7		58	34	35.3	A	9.3		4	1	41.9		9.4		40	53	28.8		9.5		15	3	36.5		9.4			17	6.2	
9.0		59	1	42.9	A	9.5			52	0.3	A	9.1			55	32.4		9.5		16	45	55.1		8.7			30	19.1	
9.2	10	1	12	41.9	A	8.5		5	26	30.9	B	9.2		42	8	20.5		6.7		18	44	34.2	A	9.5		32	40	15.9	
9.5		2	39	30.1		9.5		6	9	6.7		9.5		43	3	24.0		9.5		19	43	49.2		9.5		34	8	58.8	
9.4		6	21	15.8	B	9.4		9	53	41.1	A	9.5			46	30.2		9.4		22	22	32.6	B	9.3			51	25.6	
9.5		8	4	7.5	B	9.4		14	22	39.7	A	9.2		44	53	39.8		9.5			31	38.9		9.5		35	16	0.2	
9.0		12	22	12.4	A	8.0		15	55	1.8	A	9.5		45	50	8.3		9.5		23	0	47.3		9.5		37	5	10.0	
8.5		14	20	31.4	A	9.5		17	12	20.9		8.7			58	38.3	B	9.4		24	36	36.1		9.4		38	40	26.2	
9.5		15	27	26.5		9.5		19	35	2.2		9.5		48	20	4.3		8.5		25	26	5.5	B	8.7			53	26.9	B
7.0		19	30	3.6	A	9.2		20	16	32.1	B	9.3		49	30	53.3	B	8.6			52	27.3	B	9.5		39	3	36.9	
7.8			53	31.8	A	9.5		21	52	46.4		9.5		50	15	51.1	B	9.1			58	7.4		9.4		41	59	58.3	
7.4		22	25	34.7	A	9.5		23	42	11.6		9.5			48	49.1		9.2		27	4	58.5		9.4		42	3	34.2	
9.2		25	22	33.1	B	8.7		24	18	14.0	A	9.3		51	25	10.7		9.0			50	48.7	A	9.4			31	15.5	
7.3		29	36	31.8	F	9.0		25	8	16.0	A	7.5		52	3	1.8	A	9.5		30	57	12.5		6.5		45	13	10.0	A
9.5		32	30	21.2		9.0		30	45	7.0	A	9.4		54	15	57.6		8.0		33	27	1.2	A	8.0			58	45.0	A
9.5		33	54	17.4		9.1			52	5.8	A	8.7		55	26	39.5	A	9.3		36	7	49.2		9.5		46	22	57.8	
9.5		35	20	10.8		9.5		32	16	18.5		7.5		57	52	5.8	A	9.0		37	50	32.8		9.1			58	37.1	A
9.5		37	14	30.7		9.0		33	42	39.1	A	9.4		59	5	34.7	A	9.0			54	40.4		9.5		48	58	8.0	
9.5		39	2	48.7		9.5		35	26	12.0		9.3	14	0	34	4.3		8.4		38	33	9.2	B	9.5		50	5	38.6	
8.1			27	55.3	A	9.5		38	35	54.8		9.3		1	45	9.7		9.5		40	19	48.3		9.5			52	49.5	
9.4		41	18	10.7	B	9.5			50	19.5		9.2		3	15	21.0		9.2		41	2	6.1		9.3		52	38	28.2	
8.6		47	19	27.2	B	9.2		43	28	19.5	A	9.3		4	55	51.0	A	9.5			54	2.2		9.5		54	10	11.0	
9.5			46	20.9		8.5			52	23.1	A	9.5		5	35	45.2		8.3		44	36	2.7	A	9.0		56	18	52.9	
9.2		48	52	27.6		8.5		44	2	22.6	A	9.5			53	4.8		7.7		47	33	16.0	A	7.7		57	22	31.4	G
9.5		50	50	36.8		9.0		45	3	27.6	A	9.5		6	48	58.0		8.9		48	10	23.4	A	9.0			27	42.7	B
8.2		52	29	24.6	F	9.3		50	3	56.3		9.0		8	26	11.9		9.0		49	40	23.4	A	8.7		58	43	49.4	G
8.9		54	30	14.1	A	9.5		51	31	8.7		8.8		13	47	0.4	B	9.4			57	21.1		8.1			48	41.6	G
9.5		57	7	25.2		9.5			47	11.1		9.5		14	26	30.8	A	9.0		50	27	51.2	A	8.8		59	5	58.8	
9.2	11	4	8	41.4		8.8			59	48.4		9.5		15	36	0.5	A	8.8		52	37	23.0		7.2	17	0	3	31.2	G
6.5		5	38	16.1	S	8.8		52	36	53.7		9.5		16	21	23.9		9.5			54	11.0		9.5		2	2	50.4	
8.9		6	14	48.5		9.5		54	6	52.8		9.4		19	13	11.9		9.5		56	5	14.0		9.5		5	12	38.5	
9.5		10	6	9.7		9.3		56	5	28.2		9.5			44	52.2		8.5		57	8	26.0	S	7.9		6	59	4.7	F
8.6		13	53	32.8	A	9.3		59	40	16.0	A	9.5			51	3.0		9.1			31	41.0		9.5		8	48	37.5	
9.4			56	30.3	B	9.5	13	1	46	25.5		9.5		24	3	44.4		8.5			31	13.9	A	9.3		10	5	43.0	A

701—760					761—820					821—880					881—940					941—1000				
	17ᵘ—18ᵘ		+74°			18ᵘ—19ᵘ		+74°			19ᵘ—20ᵘ		+74°			20ᵘ—21ᵘ		+74°			21ᵘ—22ᵘ		+74°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
9.5	17	10 44	55.9		9.2	18	18 42	49.7		8.5	19	26 10	20.6	B	8.9	20	43 48	25.4		9.5	21	48 25	22.6	
9.0		11 40	40.6	A	8.9		19 36	1.1	A	9.5		43	1.2		9.5		44 48	40.8		9.5		49 32	21.8	
9.4		12 59	21.7		9.5		20 58	30.5		8.9		27 18	42.4	A	9.4		45 32	55.5		9.5		52 20	44.1	
8.3		13 36	24.4	A	9.4		22 6	26.0		9.5		30 4	32.3		8.8		46 10	52.6	A	9.1		54 54	32.6	L
9.1		15 17	17.9	A	9.5		23 2	47.5		9.5		29	13.6		9.5		16	44.7		9.2		55 20	25.7	L
9.2		45	56.5		neb		58	29.3		9.5		37	43.4		8.3		16	9.8	A	6.4		56 29	17.4	A
9.4		19 35	39.7	A	9.4		25 39	52.4	B	9.4		34 31	35.0		9.1		50 0	38.4		8.5		59 8	22.5	L
8.0		20 47	17.4	B	9.1		27 18	7.0	A	8.5		33	27.1	B	9.5		52	26.7		9.5		9	15.8	
9.2		23 44	4.6	B	8.7		23	5.3	A	8.5		36 40	59.1	L	7.8		52 35	12.4	B	9.3		42	27.4	
7.0		26 54	46.7	L	9.4		58	6.8		8.0		37 48	38.4	F	7.3		50	5.6	A	9.3		49	13.9	
9.1		27 18	37.9		9.5		28 5	53.3		6.7		38 10	0.9	G	9.1		53 20	1.3	A	8.0	22	0 42	38.8	L
9.5		31 1	25.7		9.5		46	43.0		9.3		23	40.5	S	9.5		54 30	29.7		8.2		5 0	45.1	A
7.7		32 39	36.3	L	9.5		29 2	56.2		9.2		40 43	26.3		9.5		36	10.1		7.8		26	1.1	A
8.9		33 21	0.4		9.4		32	55.3	B	8.8		41 27	3.0		9.4		54	18.8		9.5		7 27	55.4	
9.4		34 21	0.8		8.4		30 6	47.2	B	9.0		42 2	56.3		9.5		55 14	49.4		8.8		9 22	56.9	L
9.4		35 26	17.6	B	9.0		31 31	19.4		9.3		54	15.5		9.5		58 18	8.7		8.8		29	19.5	A
7.0		36 44	19.2	G	9.5		42	26.1		9.1		43 20	23.0		9.5		22	2.4		9.5		11 57	7.9	
9.4		37 20	18.5	B	9.5		55	5.2		9.3		29	26.4		8.7	21	0 17	21.0	A	9.5		13 32	40.7	
9.4		27	18.9		9.1		33 14	37.7		8.2		47 9	58.2	A	9.5		1 9	2.8		9.1		16 16	59.4	
7.4		40 0	5.1	B	9.5		34 52	59.7		9.2		48 58	59.9	B	9.5		20	11.7		8.6		25	25.4	G
9.3		1	46.2	A	8.5		57	29.3	A	8.8		50 13	56.1	A	9.4		22	25.0		9.5		19 38	56.5	
9.2		6	48.2	A	8.7		36 50	53.3	A	9.5		52 55	24.2		8.0		4 21	57.3	F	9.2		20 9	7.4	
9.3		41 1	24.7		8.6		37 5	32.1	A	9.5		57 56	45.0		9.4		5 4	7.7		8.0		22	16.3	G
9.1		42 9	26.4	A	9.3		54	36.3	A	9.4		59 13	25.8		9.3		55	4.8		8.0		22 5	6.5	A
9.0		42	23.1	B	9.5		39 29	46.5		8.5	20	0 50	27.5		9.5		7 2	24.7		8.0		44	6.0	A
8.7		43 30	26.0	B	9.0		49	11.4	B	9.2		3 44	15.8	B	9.5		9 3	5.3		9.4		24 54	17.3	B
9.1		33	58.0		9.2		40 6	39.5	A	9.5		48	14.4		7.0		10 23	37.4	G	9.4		25 29	19.3	
8.5		45 7	30.0	A	9.2		41 25	11.4	B	9.5		6 5	24.3		9.2		11 20	15.9	B	9.5		27 9	18.7	
9.3		16	42.0	A	8.2		42 32	29.4	A	9.4		8 41	16.7		9.5		12 40	30.2		9.5		28 4	55.0	
9.0		33	48.0	A	9.0		44 23	11.4	B	9.5		11 49	24.5		9.5		52	41.6		9.4		29 18	16.2	
9.4		46 3	46.2	A	9.5		48 21	12.3	B	9.4		14 32	18.8		8.5		14 25	12.7	A	9.1		21	37.4	B
8.8		47 6	58.9	A	7.5		51 2	33.7	F	9.2		15 3	41.8	B	8.3		15 37	1.3	A	9.3		21	33.9	
8.0		48 20	37.9	B	9.5		52 37	19.8		8.0		16 0	7.0	A	9.1		16 6	31.2		9.5		30 34	56.1	
8.2		31	1.7	B	9.4		55 18	19.8	B	7.8		41	57.9	A	9.2		21	6.3		9.5		31 50	9.4	
9.3		50	51.3	B	9.5		39	19.0		9.5		17 35	25.5		9.5		17 4	44.5		9.1		33 7	36.3	L
9.2		49 20	55.5	A	8.3		39	16.3	F	9.5		20 24	47.0		9.5		20 51	35.2		9.3		40	47.6	
9.3		53	44.9	B	9.5		55	38.2		9.3		21 3	55.4		9.5		21 38	26.9		9.4		34 8	56.5	
9.1		50 4	46.4	A	9.5		57 20	24.4		8.3		22 9	7.4	A	9.1		25 24	5.3		6.5		9	37.2	G
9.2		51 52	36.9		9.5		59 18	28.0		8.8		25 1	58.4		9.5		27 15	52.4		9.1		35 31	29.0	L
6.8		55 42	35.5	B	9.1	19	3 31	8.6	A	9.5		19	25.8		9.5		31 24	47.5		8.2		36 17	54.4	L
8.8		56 31	47.7		9.4		36	47.1		9.3		26 25	47.5		8.8		52	11.9		9.5		37 56	1.5	
8.0		57 35	24.5	B	8.6		4 10	50.4	B	9.5		31	13.5		9.1		32 50	22.0		9.0		38 53	41.2	L
9.4		59 26	17.6		9.0		5 20	34.6		8.7		57	37.9		9.5		57	47.0		8.9		41 32	10.9	A
9.5	18	2 28	20.5		9.3		6 22	1.2	B	9.5		27 18	33.0		9.5		35 52	2.8		9.5		42 23	16.9	
9.4		38	31.0		9.3		8 5	24.8		9.5		28 54	37.7		9.5		36 44	40.6		9.0		45 9	52.5	
9.5		4 32	53.0		9.3		37	19.9		9.5		29 10	40.7		7.4		58	34.6	A	9.0		25	47.6	L
9.4		42	39.7		9.5		47	18.9		9.4		31	52.7	B	9.5		38 43	55.3		9.3		46 4	8.7	
9.1		7 6	29.8	A	9.3		12 57	18.0		9.5		54	27.4		9.5		40 12	20.2		7.8		12	23.8	L
9.5		10	1.4		9.4		59	44.1		9.5		30 2	12.0		8.8		50	35.7	L	9.2		13	20.5	
9.1		9 23	45.7	A	9.2		13 44	23.8		8.6		31 55	30.9	B	9.5		42 4	6.3		9.3		48 42	59.5	
9.5		10 35	38.2		9.5		15 23	22.6	B	9.0		32 45	29.4		9.5		43 12	11.3		9.4		49 26	47.6	
8.5		12 48	49.1	A	8.0		18 0	46.1	B	5.5		33 25	26.5	A	9.0		44 29	4.9	A	8.8		50 17	48.5	A
9.0		13 3	9.5	A	9.4		19 10	8.2		9.5		25	12.1		9.5		45 22	57.3		9.5		51 58	6.8	
9.4		58	39.3		9.3		59	16.0		9.5		34 50	35.7		9.4		57	22.7		9.4		52 0	55.3	
9.5		15 36	35.3	B	8.4		20 50	39.2	B	9.4		38 53	40.5	B	9.5		46 32	30.5		9.0		53 41	21.6	A
8.3		40	20.6	L	8.8		21 26	2.2	A	9.5		39 19	57.6		8.9		46	26.3		9.4		51	23.9	
7.5		16 10	17.7	L	9.1		33	28.4		8.3		40 18	44.2	A	9.5		47 34	2.5		9.4		54 57	15.6	
9.1		17 36	29.5		8.8		56	13.5	A	8.5		41 53	28.4	A	8.7		54	17.7	L	9.0		56 26	6.3	A
9.0		38	13.4		9.2		58	11.6	A	9.5		42 31	6.8		8.4		54	7.1	L	9.5		53	35.6	
9.4		52	25.0		9.5		25 47	23.6		9.3		49	59.9		9.4		48 2	9.7	B	9.1		59 13	38.5	J

1001—1012					1013—1024					1025—1036					1037—1048					1049—1060				
	22ʰ—23ʰ		+74°			23ʰ		+74°			23ʰ		+74°			23ʰ		+74°			23ʰ		+74°	
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	
8.5	22	59	54	44.0	G	9.0	23	10	6	6.7		9.5	23	25	45	35.2		9.5	23	39	51	23.0		8.9	23	45	57	42.6	L
7.3	23	1	50	47.9	A	9.0			15	9.6		9.5		27	29	47.8		9.4		40	22	33.4		9.5		46	43	7.2	
9.4			55	44.7	B	9.3		11	47	52.2		9.5		28	41	42.9		8.8			51	27.7		7.2		48	17	3.8	A
9.4		2	3	24.6		6.6		12	18	30.7	G	9.0		29	31	8.2		9.3		42	39	26.1		9.4		51	10	49.0	
9.5			30	50.3		9.4		15	24	47.3		9.5		31	0	28.1		9.4			43	31.7		9.5			20	19.0	
4.6		3	17	36.3	A	8.0		16	37	59.6	B	9.0		32	43	55.2	L	8.5			45	57.4	B	9.4			54	8.4	
9.5			53	11.4		9.5		19	10	41.9		9.5			51	10.6		9.5		43	41	38.0		9.3		52	11	43.0	
9.2		4	9	21.6	A	9.5		22	26	45.8	A	6.5		33	4	28.1	G	9.5			54	38.4		9.5			48	41.5	
9.5		5	14	54.7		9.0			55	5.7	B	8.0			44	55.1	G	9.5			59	29.9		9.5		53	51	40.6	
9.5		6	34	22.7		7.0		23	20	26.0	A	8.0		35	0	45.8	G	9.1		44	21	48.8	B	9.2		55	20	14.8	
9.1		8	48	27.5	G	9.5			28	47.3	A	9.5			14	10.6		6.3		45	23	44.2	R	8.8		56	46	37.1	
9.0		9	36	0.8	B	9.5		24	27	23.9	A	9.5		36	56	28.2		9.5			55	14.1		9.5			48	3.8	

Zone +75°

1—20					21—40					41—60					61—80					81—100				
	0ʰ		+75°			0ʰ		+75°			0ʰ—1ʰ		+75°			1ʰ		+75°			1ʰ—2ʰ		+75°	
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	
8.7	0	2	9	11.0	A	9.5	0	23	5	43.1		9.3	0	36	59	9.0	A	9.5	1	14	49	6.3		8.8	1	45	7	49.8	
8.5			30	1.7	A	8.8			7	46.6	A	8.4		38	9	44.9	A	9.1		15	39	41.5		9.0		46	40	53.7	
9.2			45	2.7		9.5		24	10	47.8		9.4		40	15	47.0	A	9.5		17	9	25.4		7.2		47	14	13.5	A
7.1		6	1	13.2	A	9.5			55	56.4		9.5		44	51	28.2		9.5		22	25	43.0		9.5		48	16	17.6	
7.9			22	13.1	A	9.5			59	39.9		8.7		47	33	13.0	A	9.4		23	8	15.0		9.5			43	31.3	
8.8		9	17	19.8		9.4		26	47	1.2		9.5		50	59	30.5		9.4		24	51	51.6		5.0		51	48	24.8	A
7.4		10	9	27.7	G	9.5		27	37	22.7		9.3		51	29	40.9		9.4			58	26.4		9.5		58	59	10.7	
9.5			53	1.7		9.5		28	15	7.6		9.3		52	25	26.2		9.3		25	47	49.3		9.4	2	2	4	38.6	
9.4			58	46.7		9.5		29	26	51.0		9.5		53	14	13.0		8.1		26	19	59.0	A	9.0			27	27.1	
7.8		11	53	45.9	B	9.5		30	17	51.4		9.2		54	58	13.0	B	9.5			25	35.2		8.7		7	7	42.2	S
9.5		12	36	39.9		9.5		31	32	17.5		9.4		59	22	20.3		9.4		31	23	24.4		9.2			16	41.3	
9.5		16	23	41.4		9.3		32	55	45.4		9.5	1	3	8	14.5		7.0		32	8	7.8	F	9.5			26	48.2	
9.5			52	11.0		9.5		33	49	6.2		9.5			47	31.6		9.3		36	42	4.8		8.9			53	19.0	
9.5		18	4	7.2		9.3		34	5	15.6	B	9.0		6	16	7.7		9.4		37	27	45.5		7.5		10	15	27.4	L
9.0			13	16.4	A	9.4			38	55.5		9.5		7	3	6.7		9.2		38	42	59.3		9.1		11	8	34.7	
8.9		19	8	19.8	A	7.9		35	12	8.5	A	9.3		9	0	27.2		6.8		42	10	29.8	A	9.4			36	56.0	
9.4			11	20.2	A	9.5			23	50.7		9.1			46	5.6		8.0			40	19.0	A	9.0		13	16	1.9	
8.8		20	0	25.2	A	9.5		36	18	39.5		7.1		10	18	57.7	A	9.1		43	53	16.5		8.4			40	18.5	
9.1		22	31	53.3	A	9.4			26	35.5		6.2			19	28.3	A	9.4		44	7	29.3		8.9		17	12	4.[illegible]	
9.5			56	21.7		9.5			52	5.2		9.5		11	38	18.0		7.6			30	39.1	A	9.5			21	15.[illegible]	

101—160					161—220					221—280					281—340					341—400				
	2u—3u		+75°			3u—5u		+75°			5u—6u		+75°			6u—8u		+75°			8u—9u		+75°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	
9.0	2	19	22	51.0	9.4	3	49	14	54.2	9.2	5	3	21	56.3	6.8	6	44	44	26.0	A	8.3	8	17	58	39.8	A
8.7		23	21	53.8	B	9.1		53	47	51.7	S	8.7		5	6	50.1	A	9.1		45	3	51.6	A	6.4		19	48	13.2	A
8.0		25	49	22.6	A	9.4		54	7	19.1		9.0		6	29	36.3	A	9.5		46	37	15.8		9.5		20	14	2.5	
9.5		31	16	5.4		9.5			35	47.2		8.8		7	20	16.2	A	9.5		47	5	1.5		9.5		21	6	28.5	
9.5			58	39.3		8.7		56	17	52.7	A	9.1		8	51	26.5	A	8.9		49	26	15.3	A	9.5		24	42	5.0	
9.5		35	32	57.0		8.5			21	55.0	A	9.0		16	23	52.6		8.8		50	52	1.5	A	9.3		25	4	12.5	B
9.3			46	25.3	B	8.5			43	25.6	A	8.9		17	53	52.0		9.5		53	1	12.8		8.9		27	18	6.9	A
9.2		36	35	21.1		9.5		57	31	57.0		8.8		19	6	5.8		9.5		54	13	26.6		9.3		29	35	3.3	B
7.5		39	21	55.5	L	9.0		58	46	39.8		8.0		20	53	13.5	B	9.0			31	9.0		9.4		34	0	55.6	
8.5			38	38.9	A	9.5			49	19.1		9.5		21	2	54.3		9.0		55	40	13.3		9.0			42	38.8	
9.5		40	9	57.1		9.5		59	48	27.5		9.5		23	41	7.3		8.3		58	1	25.6	A	9.0		35	54	14.8	
9.0			27	14.2		9.5	4	2	12	18.8		9.5			55	22.0		9.0			11	49.6	A	8.5		36	46	5.5	
8.6			31	2.9	A	6.8			25	44.7	G	8.7		27	2	26.5	A	9.3		59	5	33.4	B	9.0		41	28	30.4	A
9.0			48	3.4	A	9.1		3	22	34.4		9.5		28	35	0.2		9.5			24	34.2		9.5		43	19	4.0	
9.5			54	6.7		8.5		6	4	6.6	B	9.5		29	26	56.4		9.5	7	0	18	39.3		8.8			48	59.7	J
9.5		41	5	59.1		9.5		7	13	29.0		7.5		30	27	39.6	A	7.0		2	48	19.7	A	9.5		46	36	13.4	
9.1		46	12	52.1		9.2			40	48.6		8.5		32	56	49.4	A	9.4		3	50	49.3	B	9.0		47	22	32.6	
9.4			28	9.1	A	9.5		8	4	9.9		9.3		33	2	51.6	A	9.5		5	30	14.8		9.5		48	13	44.9	
8.5			36	13.1	B	9.4			13	58.0		9.5		35	56	0.1		9.5		6	13	17.8		8.4		49	12	16.9	A
9.3		47	30	36.4		9.2		11	43	16.1	B	9.1		37	55	17.1		7.7		7	36	52.2	F	9.5		51	46	46.4	
9.5		48	11	19.6		9.4		13	6	1.6		9.5		40	5	6.8		9.5		9	15	48.2		9.1		53	13	28.2	
8.8		50	6	25.0		8.0			53	42.8	A	9.5			9	31.8		9.1		11	26	29.5		8.9		54	36	40.0	
9.4			33	13.1		9.1		14	56	44.2		9.0		43	15	43.1		9.5			40	47.2		9.1		55	4	46.2	A
7.4		51	20	13.9	B	9.1			59	40.8	A	9.5			26	2.3		7.6			57	4.8	B	9.2		57	44	27.2	
9.5		52	22	56.2		9.4		17	9	51.1	B	9.3		44	54	20.4		8.0		12	56	36.4	F	7.0			45	51.8	B
9.5			47	16.2		9.5		20	13	28.5		9.5		45	3	28.8		9.5		13	46	59.4		9.4		59	4	57.0	
8.3		53	32	30.4	F	9.4		24	9	30.5		6.2			11	34.2	A	9.5		14	54	43.9		9.5	9	2	53	44.8	
9.5		54	40	0.5		9.5		28	40	28.1		9.1		52	56	6.8		9.5		15	8	40.2		9.5		4	16	29.1	
9.5		57	56	14.2		6.0		29	26	39.8	A	9.5		53	16	17.6		9.1		17	0	24.1	A	9.5		6	15	12.3	
9.0	3	3	53	50.2	A	8.9		31	0	40.1	A	9.3		55	14	21.9		9.5		19	21	36.9		7.3			35	31.0	F
8.4		4	30	29.2	B	9.5		32	37	14.8		9.0	6	1	21	20.0		9.5		20	28	31.9	B	9.5		7	19	34.7	
9.0		6	39	48.6		9.1			52	31.1	B	9.5		2	29	49.5		7.7		23	14	52.9	A	9.4			28	27.6	
9.0			46	41.2		7.0		33	35	27.1	A	7.9		3	55	42.3	B	9.5		27	33	48.0		8.4		8	27	36.0	F
9.5		7	16	1.9		9.3		36	44	34.9	A	9.5		12	25	20.0		9.0		31	18	23.0		8.9		9	13	51.3	J
9.0			25	53.5		9.4		38	10	53.1		9.5		13	39	39.2		9.5		33	8	40.2		9.4		10	41	1.1	
8.9			47	14.2		9.3		39	3	35.0		9.5		16	54	1.8		8.8			21	35.3		9.5		12	5	55.8	
8.8		11	59	43.7	B	9.0		40	23	27.2		8.5		17	42	39.6	A	9.5		35	0	0.5		6.2			33	44.3	A
9.5		12	58	51.8		9.5		42	59	36.8		7.6		18	41	48.6	A	9.1			29	28.6		9.4		13	39	0.1	B
9.3		13	4	46.2		9.3		43	8	46.6		9.3			50	54.4	B	9.0		41	7	55.1	A	9.5		15	7	36.5	
9.5		16	21	0.5		9.3			24	1.0		8.8		21	37	21.4	A	9.0			7	4.4	B	9.4		20	42	57.7	
8.4		19	28	13.0	A	9.3			27	13.3		9.5		22	13	25.9		8.1		43	21	50.5	A	9.0		21	30	40.8	
9.2		20	0	27.5		9.5		47	15	18.7		8.6			33	48.8	B	9.5		47	6	51.8		8.8			35	29.2	
6.5		22	4	14.4	A	8.3		49	1	40.7	A	8.5			55	51.1	A	9.5		49	42	59.9		9.4		22	59	22.6	
8.6		27	7	14.6	B	9.2			29	30.0	A	8.0		23	53	11.2	A	9.3		52	45	12.1		9.3		23	16	13.3	
9.0		28	21	36.6	B	9.3		50	23	29.3	A	9.3		25	30	28.3		8.8			49	21.2		9.5			38	54.8	B
9.0		29	1	42.2		8.8			27	41.7	A	9.5		26	2	19.5		9.1			58	10.8		6.8			42	50.9	B
8.2		31	27	18.7	A	8.0			28	16.7	A	9.4		27	10	24.4		8.4		55	0	47.0	B	9.3		25	30	1.6	
9.4			30	28.5	B	7.3			31	29.0	A	9.0		29	5	3.2		9.5			38	37.4		9.0		29	32	13.9	B
9.2			55	22.1	A	9.0		52	15	7.9		9.5			57	55.4		9.5		56	54	5.0		6.8		30	6	15.3	A
9.5		35	58	15.4		8.5		54	14	16.5	A	9.5		32	22	43.5		9.5		57	18	36.4		9.5		31	19	39.5	
8.2		37	1	34.4	A	9.3			35	15.7	A	9.5		36	51	54.4		9.5			59	19.2		9.3			43	34.5	B
9.4		39	39	40.8		8.3		55	27	32.4	A	9.4		37	22	18.5		9.5	8	3	30	38.8		9.2		34	38	47.8	B
8.8		42	31	55.7		8.3		56	47	25.0	A	7.5		39	3	22.1	F	9.4			40	28.1		9.3			44	46.9	
8.2			44	45.1	B	9.5			55	35.3		8.5		40	57	36.9	F	6.5		4	39	17.2	A	8.8		35	57	38.5	
9.0		45	23	44.2	G	9.4		57	15	2.3		9.1		41	26	22.0		9.5		7	10	16.3		9.0		37	13	16.4	
8.0			56	42.7	G	9.3		58	4	7.3	B	8.2			39	7.9	F	9.5			56	17.8		8.2		38	20	6.5	A
9.4		46	13	57.0		7.6			38	46.0	B	9.5			58	57.0	B	9.5		11	37	10.9		9.0		40	30	4.6	A
9.2			21	9.0	B	9.5	5	0	55	43.5		9.5		42	17	57.9		9.0		13	16	13.8	A	9.5		43	41	46.0	B
9.4			41	43.2		9.4		1	40	42.8		9.4		44	3	43.2	A	9.4		14	2	31.0		7.2		48	22	27.3	A
7.5		47	24	59.6	A	7.5		2	46	0.5	F	7.0			43	36.4	A	9.5		15	24	25.6		8.5		53	2	1.1	A

401—460						461—520						521—580						581—640						641—700					
	9ᵘ—11ᵘ			+75°			11ᵘ—13ᵘ			+75°			13ᵘ—16ᵘ			+75°			16ᵘ—17ᵘ			+75°			17ᵘ—19ᵘ			+75°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.3	9	53	22	17.9		9.1	11	46	55	16.8		9.3	13	50	35	59.5	B	9.1	16	9	49	17.9		8.7	17	49	45	33.8	A
8.8		56	55	7.0	A	9.5		47	14	32.8		9.5			38	52.9		8.8		10	53	22.4	A	9.2		50	9	23.0	
9.3		57	21	50.5		9.5		49	36	3.1		9.4		54	33	26.8		9.3		11	47	11.1		9.2			37	0.4	A
9.0		58	26	22.1	B	9.5		51	3	8.5		9.0		55	31	25.4		9.2		13	17	40.0		9.3		51	48	5.4	
9.4			41	19.6		9.4		52	27	1.6	A	9.5	14	1	54	54.0		8.5		14	45	0.3	A	9.5		52	45	51.1	
9.3	10	2	12	48.3		9.1		57	49	50.2		8.4		3	48	15.6	B	6.8		16	15	34.1	A	9.4		57	5	39.1	
9.5		3	6	23.7		8.6		59	17	29.1	A	7.5		4	19	24.5	A	9.0		19	12	36.9	B	7.0		59	15	10.2	L
9.4			51	21.2		9.5	12	0	54	10.9		9.4			50	16.4		8.9			45	25.3		9.0	18	1	13	42.6	
8.5		4	0	54.7	F	6.7		2	43	28.1	A	6.7		5	51	16.8	A	8.6			49	29.3	A	8.7		3	40	38.2	A
9.3		7	9	50.1		5.8		12	17	59.2	A	9.0		10	31	13.4		9.5		20	47	1.7		9.5		5	11	25.2	
9.4			55	38.9		9.5		19	53	50.2		8.5		19	47	31.5	A	8.9		23	29	57.6	A	9.1			31	34.8	A
8.2		12	6	30.7	A	9.0		25	20	4.6	A	7.5		21	9	43.3	A	8.3		24	26	47.9	A	9.1		6	1	25.6	B
9.5		18	42	0.7		7.0		26	10	36.9	A	9.3		23	45	39.8		9.4		25	30	9.1		9.5			20	26.5	
9.5		20	10	34.2		8.7			19	17.5	B	9.5		26	42	3.6		9.5		27	26	9.6		8.8		7	5	51.5	
8.9			34	40.5		9.5			49	15.5		9.4		27	6	15.8		8.8		28	15	38.1	A	6.5		8	10	45.6	A
9.5		23	59	44.4		9.5		32	33	15.9	A	9.5		29	27	8.0		9.0			36	15.5	A	9.4		10	10	55.0	
9.5		26	3	7.6		9.5		34	13	28.5		9.1		30	49	2.5	A	9.0		29	5	15.0	A	9.2			19	15.1	A
9.5		27	48	4.1		9.4			26	58.8	B	9.1		31	39	50.0	A	9.5		30	10	28.7		9.2		12	19	37.8	A
8.8		28	36	39.0	A	8.2			26	12.9	A	7.8		32	22	54.6	A	9.5		33	34	42.5		9.1		15	0	12.1	
9.5		29	36	16.9		8.7		35	21	46.8		9.1		34	56	53.4	A	8.7		43	18	9.6	A	9.2		16	23	43.6	A
9.5		31	27	37.6		9.3		36	28	38.0	B	8.0		35	16	11.9	A	9.4		47	44	8.1	A	9.3			38	24.1	
9.5		33	52	38.5		9.5		37	26	48.8		9.4		45	38	30.5		9.3		50	4	39.9	B	8.8		17	9	8.0	
9.5		34	49	33.1		8.9		39	16	48.2	A	9.3		48	34	33.5		8.4			12	16.3	B	9.2		19	57	41.8	
8.4		36	6	17.9	F	8.7			41	23.2		9.5		52	41	37.2		9.5		51	15	59.8	B	9.4		22	16	13.6	B
8.6		39	49	48.3	A	9.5		41	41	35.5		7.2		56	4	27.8	A	7.0		54	5	36.5	A	9.4		23	20	18.6	
9.0		40	8	57.9	A	8.7		44	34	1.0	A	9.1		57	48	20.7	A	9.2		56	22	58.3	A	9.4			45	58.1	
9.5		41	56	43.9		9.2			40	8.1	A	7.0			59	28.5	A	8.6		57	11	10.6	B	8.4		26	15	27.6	L
9.5		45	32	2.6		9.1		46	27	9.1	B	9.5		58	7	18.1		6.8			30	38.0	A	8.0		27	22	45.0	L
8.0		46	36	7.1	F	8.5		49	10	26.2	A	9.2			23	30.5	A	9.4		58	34	50.5		8.7		28	53	17.2	B
9.4		48	21	17.0		9.1		50	5	25.6	A	8.7	15	1	24	32.9	A	9.4	17	3	58	55.8	B	9.5		29	21	55.3	
8.0		49	35	33.6	F	9.5			50	40.4		9.4		2	34	49.2	A	8.9		4	17	27.8	A	9.5			57	10.0	
9.5		50	6	41.9		9.5		58	36	19.5		9.2		3	3	23.1	A	6.5			59	24.9	A	8.7		38	4	28.1	A
9.5			39	11.1	A	9.5			48	12.5		9.5		5	38	45.7		5.8		6	16	29.7	A	9.2		39	37	17.6	L
8.4		53	14	9.6	A	9.5	13	0	19	12.4	B	9.0		8	49	8.5		9.0		8	7	54.4	A	8.5		40	51	21.8	L
9.5		55	17	27.3		9.5			56	3.7		9.5		10	2	14.8		8.3		10	6	41.0	B	9.5		41	19	14.5	
9.5	11	0	11	18.5		9.2		1	28	52.5		9.5			47	47.6		7.0			34	17.5	A	9.2			44	27.3	L
9.5		1	57	4.1		9.5			38	31.6		9.5		11	44	35.9		7.5		15	21	16.1	A	9.5		45	39	53.4	
7.4		7	29	7.7	F	9.0		2	33	31.0	A	8.7		12	6	37.9		8.4		16	36	20.5	A	7.5		46	3	9.0	A
7.8		9	32	52.5	A	9.5		4	27	53.6		9.0		18	30	25.9		9.4		19	2	58.4		9.5		47	54	45.5	
8.8		10	43	12.7	A	8.0		5	32	56.4	A	8.3			52	47.6	A	9.3		20	33	52.5		8.7			54	43.3	B
9.5		13	38	50.1		8.4		10	55	7.9	A	7.7		20	44	23.5	B	9.5		21	15	32.8		9.5		48	27	3.7	
9.4		18	38	45.2	A	9.5		12	40	42.3		9.2		22	15	38.8		9.4		22	1	50.7	B	5.8		51	3	15.5	A
9.2		20	20	43.2	A	9.5		14	13	2.1		9.3		23	23	16.1	B	9.5		24	5	31.7		6.5		58	25	35.2	A
9.5		22	5	0.9		9.1			48	19.2		9.5			50	9.9		9.0			10	48.0	A	9.2			28	53.5	B
8.8		24	18	58.1		9.0		18	47	18.2	A	9.1		24	19	55.4	A	9.5			26	26.7		9.4			44	52.8	
9.5		25	13	29.8	B	9.5		24	11	7.5		8.1			49	54.5	A	8.9			55	30.4	B	9.5	19	2	51	34.6	
9.0		26	37	0.9		7.5		26	50	36.9	A	9.2		27	4	57.4	A	9.5		25	17	1.9		9.5		6	34	16.5	
9.3			57	59.8	B	9.1		28	23	32.4		9.5		28	18	3.4		9.0			23	46.1		9.1		9	59	43.5	A
9.1		27	29	37.4	B	8.5			59	7.0	B	8.9		29	34	41.3	A	9.2		26	53	58.8		9.3		14	11	23.3	
8.0		28	4	55.2	B	9.5		30	21	44.2		9.5			52	46.2		9.5		28	27	18.6		8.0			29	55.9	B
9.4			22	59.9	B	9.5		32	27	13.8		9.1		35	53	54.8		9.4			49	34.8		9.3		15	57	41.0	F
9.4			56	55.9		7.7		36	7	2.8	B	8.8		37	47	48.2		9.5		31	3	52.6		9.3		19	30	14.[illegible]	
9.5		29	52	58.9		9.4		37	26	50.9	A	9.3		39	8	8.9		9.3		34	1	41.1		9.3		20	52	13.[illegible]	
9.0		30	13	51.5	A	8.5		39	0	11.9	A	8.0		42	18	45.2	A	8.3			32	44.1	L	9.5		21	6	[illegible]	
7.8			51	49.6	A	9.2			18	3.0		8.5		51	11	44.1	A	8.5		35	5	9.3	B	9.2		25	30	[illegible]	
9.5		35	41	11.7		8.0			43	21.6	A	9.0		52	56	2.0		9.5		36	31	37.8		9.4			41		
9.5		37	13	36.4		9.3		43	12	59.1		9.0		53	6	12.3		8.5		38	40	18.5	A	9.4		26	2[illegible]		
9.3		38	24	52.9		9.5		47	59	41.9		8.9		56	41	13.3		9.4		42	32	23.5		9.5		29	[illegible]		
9.5		39	39	48.2		9.5		48	32	54.4		6.5		58	34	59.7	A	7.5		44	13	58.8	B	9.5		31			
9.0		44	34	45.2		9.4		49	8	56.0	B	9.5	16	7	8	27.7		7.0		47	44	35.3	A	9.4		3[illegible]			

701—742					743—784					785—826					827—867					868—907				
	19h—20h		+75°			20h—21h		+75°			21h—22h		+75°			22h		+75°			22h—23h		+75°	
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	
8.9	19	35	40	21.1	9.5	20	31	41	40.5	9.5	21	20	27	26.2	9.1	22	22	58	56.1	9.4	22	58	6	17.8	A
8.5		36	53	16.8	L	9.2		33	0	59.3	9.5		23	25	6.6	8.9		23	27	26.4	A	8.7		26	43.8	A
9.5		37	25	28.5		9.1			13	34.8	6.7			47	55.3	A	9.1		37	34.7	A	9.3	23	4	20	3.6	A
9.4		38	35	50.8		9.3			57	9.5	6.8		24	58	19.9	G	9.5		24	9	39.6		8.5		6	13	14.3	A
9.5		40	20	22.6		9.5		36	13	12.9	B	9.5		27	37	28.2		9.5			14	25.8		9.5		7	46	1.6	
9.2		43	5	29.3	A	8.8		37	14	50.1		9.4		29	5	55.5	B	7.7		26	24	28.8	A	9.5			57	57.5	
9.5		47	18	57.6		9.5		38	19	44.1		7.3			7	46.0	A	9.5		27	54	25.9		9.3		9	38	0.7	
9.4		48	36	35.2		8.5			32	30.4	L	8.0		30	41	40.0	A	9.4		28	34	36.5	B	9.5		11	19	45.2	
9.1			57	46.8		9.4			54	8.8		9.5		32	45	18.8		9.5		29	23	7.8		9.0			53	44.3	
9.5		49	2	58.7		7.2		39	14	3.9	B	9.5		33	19	43.5		5.7			44	27.3	A	9.5		15	16	34.0	
8.5		51	16	29.3	A	7.8		41	13	21.5	A	9.5		37	19	23.8		9.5		30	26	34.7		9.5		16	38	54.6	
9.5		52	29	16.5		9.2		46	9	15.1		9.5		40	50	56.9		9.5		32	28	35.7		9.3		21	59	54.2	A
8.5		53	57	40.6	A	8.7			32	3.1	L	8.8		41	3	40.5		9.2		33	24	44.1		8.8		23	36	49.7	A
8.5		54	24	1.3	A	8.7		48	40	26.9	L	9.4		42	44	10.5		9.1			48	59.7		9.2		25	49	10.9	A
9.3			27	1.6	A	9.4		49	17	5.8		9.3		43	35	27.7		9.4		34	14	7.3		9.0		27	42	48.3	A
9.1		58	46	29.8	A	9.4		50	0	27.9		9.5		45	4	52.9		8.7			45	58.7	B	9.5		28	21	54.5	
8.5			48	11.1	A	9.0		51	3	26.9		8.5		46	15	48.3	A	9.5		35	46	37.2		9.4		29	8	31.7	
7.2	20	0	22	18.9	A	8.3			16	11.7	L	9.0			40	31.1		9.4		37	23	10.7		9.2			33	49.6	A
9.4		3	13	3.3		9.5		52	1	44.1		9.5		51	59	45.7		9.5			38	43.0		9.4			54	26.9	
9.5		7	0	38.5		9.5		53	24	6.1		9.5		54	0	44.7		9.5		38	2	6.9	B	9.5		30	0	47.4	
8.8			26	5.2		9.5		55	36	52.9		9.3		55	13	15.9		9.0			17	56.0		9.5			4	44.3	
9.5		8	40	57.3		6.0		56	29	20.9	A	9.4		56	20	24.5		9.5			38	4.4		8.3		34	3	5.3	L
9.0		11	10	14.1	A	6.6		57	42	8.6	A	9.5			42	38.6		9.0		39	21	23.0		9.3			16	11.9	
9.2		12	19	9.6	A	9.5	21	0	44	17.0		7.5		57	0	23.2	F	9.1		40	1	51.5		8.3		37	10	13.3	L
9.4			46	36.1		9.5		2	20	15.5		9.5			21	53.7		8.5		43	40	55.1		9.3			36	25.0	
8.0		13	10	48.7	L	9.5			31	16.4		9.4			49	21.0		9.5		44	45	59.3		8.6		38	41	51.9	
9.5		14	27	17.9		9.5		3	12	6.6		8.6	22	4	14	53.7	A	9.3		47	52	15.0		9.0		41	7	45.3	
9.5		17	12	57.3		8.0		4	27	1.8	F	9.4		5	17	20.8	B	9.0		48	33	18.5	B	9.5			19	38.8	
9.4			51	26.8		9.5			54	9.6		9.2			43	43.6	A	9.0			43	15.0		8.7		46	45	7.0	L
8.8		19	9	20.9	A	8.8		5	15	14.6		8.0		6	43	45.5	A	9.5		49	12	3.0		8.4			46	46.3	A
9.1			23	47.5		9.0		7	31	39.9		9.3		8	26	20.4		9.0			44	43.1	A	9.5		47	50	44.9	
9.5		20	36	33.8		8.2		8	22	47.0	F	9.2		9	44	23.0		7.7		50	34	33.6	A	9.0		48	5	57.9	A
9.3			39	6.0	B	9.5			37	36.1		9.4		10	4	43.7	B	9.5			53	26.4		9.5		49	25	3.1	
9.4			49	42.3		9.5		9	34	37.1		7.0			58	44.6	A	9.5			58	24.5		7.8		50	18	30.4	B
8.5		21	7	18.0	A	9.5			42	25.2		9.5		13	37	20.4		9.5		51	47	44.4		9.1			46	59.4	A
9.2			56	46.5	B	6.8		13	23	42.5	L	6.8		16	34	45.6	A	8.0		52	11	10.0	A	9.5		51	2	27.2	
9.0		23	7	38.1	L	9.5		15	30	15.0		8.9			54	37.2		9.2		53	14	8.5	L	8.5		54	28	21.8	
9.5			43	33.3		9.5		16	38	40.5		7.3		17	6	17.0	G	9.5			58	47.9		9.1		55	36	25.2	
7.3		25	40	34.1	L	8.4			49	56.3	A	7.8			50	23.9	A	9.1		55	41	32.6		8.5			51	30.2	F
9.4		28	40	58.2		8.9		19	4	29.2	A	9.3		19	10	52.4		9.4		56	44	50.1		8.8		57	59	29.1	F
9.5		29	39	15.8	B	9.5			54	0.3		8.7			52	24.8	A	7.5			56	19.8	A						
8.5		30	29	40.5	L	9.5		20	13	20.3		9.3		21	2	14.2													

Zone +76°

1—40					41—80					81—120					121—160					161—200				
	0ᵘ—1ᵘ		+76°			1ᵘ—2ᵘ		+76°			2ᵘ—3ᵘ		+76°			3ᵘ—4ᵘ		+76°			4ᵘ—5ᵘ		+76°	
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	
9.5	0	1	37	6.3	9.5	1	8	52	53.0	7.0	2	19	5	4.4	A	8.0	3	11	7	38.1	A	9.5	4	8	26	58.7	
9.4		5	47	32.1	8.0		14	6	54.8	A	9.1		43	26.7		9.5		39	59.5			9.1		45	18.3	A
9.4		6	26	24.3	9.5		15	38	5.3		9.3	20	1	45.8		9.0		59	45.5	A		9.2	14	29	5.4	
9.4			38	50.5	9.4		16	37	22.9		9.3	22	17	8.9		9.4	14	29	9.9			9.1	17	42	5.3	
6.5		8	7	8.8	A	9.3	18	27	41.5		9.5		42	4.7		8.6		43	6.3	A		8.0	18	56	39.5	G
9.0			49	48.1		9.5	19	43	57.9		9.5	23	39	39.0		8.7	15	5	19.6	A		8.8	19	30	26.6	
9.1		11	21	20.2		9.3		48	6.6		9.5	26	44	11.4		9.5	19	29	2.3			8.6		32	38.4	G
9.3		15	53	17.7	A	9.4	20	34	8.5		9.4	27	31	51.6		7.5	23	59	41.2	A		9.0		39	7.8	
9.5		18	43	30.5		8.6	22	36	51.8	A	9.5	28	9	51.4		9.2	25	12	27.0			8.0	20	42	14.3	F
6.5		21	43	12.9	A	9.4	25	12	16.5		9.5		27	43.1		9.5		38	37.3			9.4		46	40.4	
9.5		24	27	28.3		9.4		18	8.2		9.3	29	42	21.2		9.1	26	6	25.8			9.5	21	52	15.8	
8.4		25	46	42.1	A	9.5	27	56	22.8		9.5	33	15	57.1		9.5	29	45	49.6			9.2	22	15	11.5	
9.5		26	49	19.0		8.5	28	18	5.9	A	9.4	35	4	22.6	B	9.4	30	18	0.8			8.9	25	9	44.5	B
7.0		30	30	4.7	L	9.3		29	6.0	A	9.5	36	30	34.6		9.2		19	18.8			6.3	26	3	19.3	A
9.4			40	28.8		8.8	30	18	56.8	A	9.0		59	21.5	A	8.9	31	19	41.8	A		9.2	28	44	14.8	
9.0			49	2.9	B	9.4	31	30	54.8		9.5	37	10	32.0		9.5	32	39	9.7			8.8	30	39	56.5	
9.2		31	20	53.3	A	9.4	32	15	37.7		8.9	40	21	56.4	B	8.2	33	58	9.8	A		9.3	31	1	6.0	
9.5			21	23.8		8.0	36	32	16.0	A	8.7		21	2.4		9.4	35	22	0.1	B		9.4		1	23.8	B
9.5			52	19.1		8.5	37	57	56.3	A	9.2	42	2	17.3	A	9.5		49	3.6			9.4	32	51	2.5	
8.9		33	17	11.1	A	9.5	44	36	19.9		9.1		8	17.6	B	9.0	36	35	26.1	A		9.5	34	13	47.1	A
9.2			30	53.8	A	9.1		59	52.8		6.8		14	29.2	A	9.0	37	50	16.3	A		9.4		23	26.6	
8.2		34	34	25.3	A	9.5	50	37	33.5		9.5	46	4	22.2		8.2	38	8	58.5	B		9.5	36	27	41.3	
9.1		35	2	11.9	B	5.3		45	34.8	A	9.4		25	42.2	A	8.9	39	47	21.7	A		9.5		44	15.2	B
9.1			43	54.2	B	9.5	51	38	29.9		9.5	47	29	20.9		9.0	41	2	19.7	A		9.5	37	6	55.5	
9.0		38	59	11.0	A	9.0	52	0	38.2	A	9.4		31	26.2	B	9.5		2	48.8			9.3	40	17	24.5	
9.1		41	34	35.7		8.9		5	47.5	A	9.5	48	49	31.1		9.4	42	12	16.3			8.8		24	15.1	
9.0		45	35	15.1		9.2		25	30.0		9.5	49	14	36.6		9.5	44	24	41.8			8.0	45	35	36.8	A
8.0		46	43	41.1	A	9.0	54	4	5.6		9.4	50	51	0.7		9.5	46	44	29.0			8.1	47	33	25.4	A
9.5		47	1	37.5		9.3	55	23	53.3		8.9	52	12	1.0		8.8	50	15	36.0			8.2	49	10	24.0	A
8.8		48	29	40.7	A	9.4	56	52	30.4		9.0		33	57.6	B	9.0		24	2.7			6.7	54	18	16.7	A
8.2		50	29	5.2	A	9.5	58	58	51.3		9.4	53	6	53.6		8.7	52	28	19.8	F		9.0	55	31	19.1	A
9.5		55	13	6.1		9.1	59	18	28.3		9.4		14	20.7		9.4	53	19	28.6			9.5	56	11	37.3	
8.1		57	9	54.1	B	9.1		38	26.2		9.3		33	25.6		8.8		32	40.4			9.5		13	32.8	
8.9			9	40.0		9.4	2	1	8	24.5	9.3		57	26.7		9.5	56	3	40.4			9.5	5	3	58	45.5
9.3		58	47	38.2		9.0		13	15.4	A	9.5	55	53	32.0		9.5	57	19	20.3			9.5		5	12	30.3
9.3	1	0	46	58.3		9.0		4	31	41.5	8.8	59	14	1.7	A	9.2		40	8.8			9.1		9	11	27.4
9.2		1	55	26.4		9.5	10	29	2.2		8.7	3	0	20	11.9	A	9.5	4	1	4	56.6		9.3		11	6	5.1
8.9		4	55	1.8	A	9.5		54	45.0		8.5		56	45.9	A	8.8		4	7	14.2	A		8.5		30	25.9	
7.0		7	37	0.7	A	9.5	13	24	40.6		8.3		1	50	27.2	A	9.5		5	58	52.1			9.2	13	12	54.0	
6.4		8	21	47.5	A	9.4	14	56	54.3		8.2		3	29	30.7	A	9.5		8	20	40.8			9.5		19	16.1	

201—260					261—320					321—380					381—440					441—500				
	5ᵘ—6ᵘ		+76°			6ᵘ—8ᵘ		+76°			8ᵘ—10ᵘ		+76°			10ᵘ—11ᵘ		+76°			11ᵘ—13ᵘ		+76°	
m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′	
9.5	5 13	39	29.0	B	9.5	6 52	38	24.8		9.2	8 10	8	40.0	B	8.8	10 3	57	33.1	A	8.9	11 59	30	53.6	A
9.4	18	3	3.3	B	9.5		46	30.7		9.5		27	46.2	B	9.0	4	39	22.3	A	9.4	12 2	29	52.7	
7.8	19	7	39.7	B	9.1	54	6	37.3	A	9.5	11	2	25.0	B	9.4	7	8	45.5		9.0		57	14.8	A
8.3		23	15.1	A	9.5		41	33.2		9.5	13	37	48.2		9.5	8	49	29.6		9.3	14	11	11.4	
9.2	20	24	6.2		9.5	57	1	50.3		9.2	14	14	14.7	B	8.7	9	40	21.6	F	9.5	15	58	48.2	
8.3	21	20	21.9	A	9.2		4	0.1	A	8.8		37	13.2	A	7.7	11	46	24.2	A	8.8	17	19	40.4	A
8.3	23	54	52.8	A	9.5	59	19	22.1		9.3	22	14	17.2	A	9.0	14	15	26.7		8.5		27	31.5	A
8.6	24	44	17.7	B	9.2		35	4.8	A	9.4	23	20	43.2		8.0		50	38.5	A	9.5	18	36	43.3	
9.5	27	43	39.1		9.2		37	32.2		9.2	33	50	0.5		9.3	16	10	58.1		8.2	20	4	33.0	A
9.5	31	20	31.7		9.0	7 0	35	32.2		9.1	37	27	26.4	A	9.5		36	38.5		9.5	23	30	3.5	
8.1	33	53	48.9	A	9.0		2	52	13.6	A	9.5	39	54	11.8	A	9.4	17	52	13.1		9.5	24	41	6.4	
9.2		53	42.0	A	9.1		3	21	44.0		9.5	41	3	12.2		9.5	18	33	4.0		9.3	25	7	0.0	
9.4	34	6	0.3		9.4		6	47	21.1		9.5	44	23	59.9		5.0	22	33	28.1	A	8.7	26	41	50.7	A
9.5		9	5.4		9.4		7	57	53.8		9.5	45	39	18.8		9.4		35	52.7		6.7	27	59	0.5	F
9.2	35	24	45.5	A	9.5		8	55	46.0		7.5	46	12	57.5	A	9.4	23	14	57.5		9.3	28	39	25.1	
9.4	36	41	24.8	B	9.5		10	29	9.3		8.3	47	23	14.8	J	9.1	24	19	28.4	A	9.4		54	6.8	
9.5	39	34	58.7		9.4		12	38	24.8		9.4		51	43.4		9.4		28	38.3		8.5	29	11	49.2	A
9.5	41	0	37.6		9.3		13	0	23.4		9.0	49	18	55.0	A	9.5	26	41	16.7		9.4	31	47	39.9	A
9.1	42	9	37.7	A	9.5			3	4.0		9.3	53	35	11.1	A	9.5	27	47	48.5		9.2	32	23	51.7	A
8.5		26	55.3	A	9.1			58	18.5		9.4	55	29	11.1	A	9.5	33	25	35.3		9.2		34	38.8	A
8.8	46	39	8.6	A	9.3		17	32	17.1		9.1	56	30	12.4	A	9.4	38	24	23.5		9.4	33	12	0.2	
9.5	47	49	45.5		9.3			44	39.5		9.5		55	43.2		7.0	39	45	46.1	A	7.2	35	16	42.6	A
9.5	48	41	6.8		9.5		18	2	7.9		9.4	9	0	4	45.4	9.5	42	43	11.2		8.1	36	0	58.5	B
8.3	49	51	46.0	B	7.3		19	46	6.1	A	9.5		3	31	12.7	9.0	43	14	49.0	A	8.3		40	9.3	A
9.5	51	27	42.5		9.5		20	28	37.2		9.5		58	8.2		9.4	45	8	59.3		9.5	39	48	36.2	
7.5	54	8	30.7	G	9.5		21	30	22.3		9.5		6	35	11.4	7.3	47	57	29.9	F	8.5	41	49	1.6	B
9.3	56	31	13.8		9.5		22	22	52.3		9.4			39	2.2	9.2	48	10	27.5		9.5	44	21	20.6	
8.5		51	42.0	B	8.9			36	35.7	A	8.1			45	17.3	B	8.7		30	15.6	G	9.4		59	20.6	
9.5	57	0	12.3		9.1		23	38	43.0		8.8		8	18	45.2	9.0	49	8	11.7	G	9.5	49	27	23.0	
9.3		14	45.8		8.6		24	6	18.0	A	9.2		10	30	40.9	A	8.8	51	32	40.7		6.8		42	11.6	A
9.5		27	32.4		8.8			22	10.9	A	8.9		11	12	32.6	A	8.0	52	39	13.2	A	8.8	51	8	22.0	A
9.5		36	37.9		8.0		25	19	24.3	A	9.5			46	2.0		8.7	56	22	43.2	A	9.2	52	30	15.1	
8.6	58	11	48.4	B	8.5		26	1	7.8	A	9.4		13	47	9.8		9.2	57	28	21.5	A	6.0	54	31	15.3	F
7.5		22	51.9	F	9.4		28	6	25.4		9.4			55	2.1	A	8.8		45	54.4		8.8	56	59	52.6	
9.5	6 2	3	48.7		9.3		29	13	24.2	B	9.4		15	25	52.7		8.7		58	35.9	A	9.5	57	48	31.1	
9.5		51	10.4		8.6			19	21.6	F	9.5		18	44	33.8		8.7	58	8	37.8	A	8.9	13	4	1	50.7
8.8	4	42	17.9		9.3			40	10.6		8.8		21	49	46.5		9.5	11	0	6	27.0	A	8.9		5	28	25.7
9.4	6	6	47.7	B	9.5		32	46	30.7		8.0		22	27	48.3	B	9.5		59	3.2		8.8		6	16	21.3	A
9.3		35	22.7		9.5		38	48	47.9		8.8		24	28	52.7		9.5		1	28	27.0	A	8.9		7	41	21.7	A
7.8	7	11	5.0	G	9.5		42	55	24.8		7.3		25	51	4.8	B	9.4		3	39	9.3		9.5		8	23	3.6	
9.2	9	1	6.7		9.5		43	7	28.8		9.1		26	31	11.5		7.6		7	6	8.9	F	9.1		11	27	50.3	
8.9	10	4	33.1		8.5		44	55	56.3	A	8.4		28	49	33.0	B	9.4		8	10	52.0		9.5		13	46	31.5	
8.5	11	30	12.4	F	8.8		45	10	26.4	A	8.5		31	59	57.6	A	8.3		9	34	57.6	A	9.5		14	7	3.3	
7.5	14	19	57.8	A	9.5		49	59	28.8		9.3		32	20	41.9		9.4		15	38	28.2	A	9.2		18	37	30.7	
9.5		59	33.6		9.0		51	50	49.8		9.4		34	5	4.6		9.5		17	6	0.4		9.3		21	6	32.5	
9.4	15	47	4.3		8.8		55	7	2.1	B	9.1		35	4	23.2	A	9.4		21	23	8.5	A	8.0		22	42	45.3	A
9.1	17	54	29.1	A	7.8			53	16.2	A	8.9		36	52	49.2		9.1		23	29	20.8	A	8.5		24	41	56.6	A
9.2	21	55	47.4		7.5		58	29	9.8	A	8.9		41	45	49.2	A	9.4			57	27.2	B	9.1		27	8	20.8	A
7.5	23	38	42.8	A	8.3		59	0	38.8	A	9.4			56	54.1		9.3			59	34.1	A	8.7			24	22.0	
9.1	28	4	42.9	A	6.0	8	1	10	11.3	A	9.5		45	8	27.2		9.3		24	30	15.9		9.5		29	0	1.6	
9.0	30	22	43.9	A	8.9			14	20.8	A	7.8		46	10	42.4	A	9.5		32	16	15.7		6.7		30	29	48.8	A
9.5	32	30	40.8		9.5			51	47.5		9.5			37	51.2		9.1		38	16	32.2	A	7.0		31	52	31.2	A
9.5	39	25	1.8		9.4		2	5	39.4	B	9.5		49	31	37.0		9.5		39	59	18.8		7.8		34	25	39.5	A
9.5	42	36	47.5		9.5			28	37.9		9.5		53	26	41.9		7.3		42	48	9.2	A	9.2		36	46	48.3	A
9.5		56	41.0	B	8.3			39	20.5	A	8.4		55	42	31.0	A	9.4		46	21	41.7		9.2		39	50	32.0	B
9.1	43	13	55.8		8.2			50	48.0	A	8.9		59	51	44.8	A	9.5		52	17	10.9		9.5			56	19.4	
9.5	45	59	59.7		9.5		4	35	8.9		8.3	10	1	6	54.6	A	8.8		54	11	0.8		9.3		41	25	4.0	
8.0	46	23	20.9	A	9.3		9	13	25.2	B	9.5			33	1.6		9.5		55	51	53.9		9.3			29	11.7	
9.5	50	6	2.4		9.5			22	40.7		9.3		2	54	3.7		7.7		56	30	52.4	A	9.0		42	11	5.3	B
9.5	52	24	47.0		9.5			50	22.2		8.3		3	19	9.5	A	9.5		58	18	35.9		7.5		45	53	16.9	A

501—560					561—620					621—680					681—740					741—800				
	13ᵘ—15ᵘ		+76°			15ᵘ—16ᵘ		+76°			16ᵘ—18ᵘ		+76°			18ᵘ—19ᵘ		+76°			19ᵘ—20ᵘ		+76°	
m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′		m	u	′ ″	′	
9.2	13	47 39	14.6	A	9.3	15	26 48	26.6		9.3	16	49 24	34.5		9.5	18	19 10	47.5		9.5	19	34 4	9.4	
7.0		48 1	17.3	A	9.5		27 21	5.5		9.5		52 30	2.1	B	9.5		21 22	21.0		8.7		18	25.4	B
9.5		49 36	12.6		7.5		37 56	54.8	P	8.3		53 30	32.1	A	9.4		22 3	8.6		9.5		58	12.9	B
8.3		53 49	58.4	B	9.3		38 11	12.0		9.3		54 54	52.6	A	9.3		23 50	5.8		8.6		37 46	19.9	
9.5		59	33.2		9.2		23	8.5	B	9.4		55 12	48.4	B	8.7		25 30	31.7		8.7		38 17	8.2	
9.5		57 13	15.9		8.5		39 17	30.4	B	9.3		58 46	6.2		9.0		26 44	28.5		9.5		57	22.8	
9.5	14	0 48	58.7		9.5		41 20	4.1		9.2	17	4 6	18.3	A	9.5		38	47.1		9.1		39 21	37.5	
9.4		1 49	16.4		9.5		42 12	27.2		9.4		52	11.2	A	9.1		28 49	54.0		9.5		41 13	8.5	
9.5		2 51	12.6		9.0		21	53.3	A	9.5		54	6.9		9.5		29 39	30.0		9.5		15	51.3	A
9.3		3 23	4.6	B	9.5		43 57	50.8		9.5		5 0	46.0		9.0		30 29	11.7		8.4		43 30	3.0	A
9.3		58	6.7	B	9.5		47 32	0.1		9.5		6 13	25.1		9.5		32 14	2.4		8.5		53	12.5	A
9.5		8 56	42.5		9.5		56	46.9		8.9		9 36	55.6		9.5		55	16.2		9.0		44 15	46.1	A
9.1		9 49	43.9	A	8.2		49 7	3.4	A	9.2		10 51	48.2		9.0		34 13	52.7	A	9.4		21	2.6	
9.2		13 48	3.4	A	8.5		53 35	1.8	A	9.4		52	51.6		7.8		35 2	6.2	A	9.2		32	40.0	A
8.7		14 32	17.4	A	9.5		55 55	24.6		7.8		12 10	2.1	F	9.5		41 20	5.4		9.3		46 19	21.3	
9.1		15 3	15.9	A	8.9		58 0	33.8	B	8.5		14 0	55.5	B	9.2		43 18	19.1	A	9.5		47 59	58.6	
9.5		23	26.6		8.4		2	4.0	A	9.5		12	46.1		9.2		44 5	35.1	B	9.5		53 16	43.0	
9.2		56	5.8	A	8.7		6	11.6	A	9.5		48	45.8		9.3		29	2.4	B	9.0		54 2	52.7	L
9.5		17 54	50.3		9.5		59 2	0.6		9.2		20 31	33.0		9.5		45 3	38.1		9.1		13	36.5	
7.8		18 33	19.9	F	7.5	16	1 37	29.4	B	8.2		21 53	21.6	A	9.0		46 24	15.7	A	9.4		55 58	20.9	
9.5		45	57.7		9.1		37	51.6	S	9.2		22 9	12.3		9.5		47 31	13.7		9.0		56 52	55.6	L
9.5		19 45	32.2		9.5		2 16	8.7		9.3		54	40.4		9.5		35	52.0		9.4		59 15	37.1	
9.4		22 59	43.4	A	9.2		4 13	39.3		9.3		23 51	19.8		9.5		59	6.3		8.9		20	53.5	
9.5		23 44	46.4		8.4		5 44	30.9	B	8.7		25 17	9.1	A	9.3		50 29	11.0	B	9.5		21	54.1	
9.5		24 37	1.2		9.0		6 1	39.2	B	9.5		26 58	37.9		9.4		38	5.2		9.2	20	0 8	56.6	
9.5		26 30	35.0		9.2		17	39.2	B	8.8		28 59	12.4		9.2		51 37	34.9		8.2		11	2.9	A
5.0		27 51	20.9	A	9.0		41	26.9	B	7.0		29 3	10.4	L	9.4		53 27	38.5	B	9.0		24	17.9	
8.3		29 29	23.7	A	9.4		51	48.9	B	8.0		34 29	49.2	A	9.5		39	29.0		9.2		1 44	34.7	
8.8		45	1.8	A	9.2		8 4	40.3	B	9.3		35 58	29.1		9.5		56 34	3.9		8.5		2 48	35.7	A
9.2		35 38	2.2		8.1		13	10.4	B	9.3		37 27	20.3	A	8.4		58 1	56.9	A	8.8		3 9	5.6	A
9.4		36 27	30.2		8.5		10 30	9.3	B	8.5		50	23.6	A	9.5		59 34	46.0		6.0		36	3.5	A
9.5		37 59	41.1		8.9		11 4	13.9	A	9.5		38 31	45.3		6.5	19	3 56	49.7	A	9.5		5 2	37.5	
9.5		39 44	48.9		9.3		16	26.6		9.5		40 0	50.2		9 3		4 56	19.2		9.2		6	33.6	A
9.0		44 20	25.2	A	6.0		15 2	15.8	A	9.4		25	51.0	B	9.3		8 14	50.8		9.0		37	25.3	A
9.5		47 31	16.4		9.5		20 16	35.0		9.5		43	13.9		9.0		11 53	56.6		9.5		7 54	30.7	
7.5		48 36	40.0	A	5.3		21 49	4.9	A	9.1		42 23	7.9		9.4		13 25	45.3		9.2		10 13	27.2	A
9.4		41	58.2		8.8		22 8	0.1	A	8.6		43 50	16.9		5.5		14 26	18.9	G	9.5		20	16.9	A
9.5		49 57	38.6		9.3		23 19	7.9	A	9.4		45 3	5.0		9.1		29	43.4	A	9.1		29	12.0	A
9.5		50 52	26.7		9.4		41	57.1	B	9.5		46 31	57.0		8.6		15 43	21.9	L	9.5		43	14.0	
8.9		52 7	18.3		7.2		24 28	28.5	F	9.0		49 2	29.1		9.4		16 35	10.5		9.3		13 15	48.3	
9.5		30	48.6		8.5		50	9.0	B	8.8		50 2	59.5		9.1		17 25	56.1	A	9.2		32	25.7	
9.0		53 38	54.7	A	9.4		25 35	54.1		9.4		52 6	28.1		8.3		53	37.6	A	9.3		37	22.8	
9.5		57 25	39.6		8.8		55	47.6		8.5		11	32.0	A	9.3		18 12	49.3		9.1		56	48.1	
8.8		36	51.8		9.4		26 26	13.8	A	9.0		32	23.4	B	9.3		19 26	14.9	B	8.8		14 15	44.5	
9.4	15	0 10	5.4		9.2		28	39.4	S	9.4		53 12	5.9		7.8		39	1.7	L	9.0		15 9	47.2	
9.5		3 20	11.3		7.5		27 30	46.2	A	9.4		54 15	8.5		9.1		22 16	25.0	A	9.5		17 8	30.2	
9.2		6 0	3.4		9.5		28 5	8.5		5.2		55 54	57.9	A	9.4		21	52.4		9.5		18 9	10.6	
8.0		54	54.6	A	9.5		29 58	48.1		7.5		57 51	1.0	B	9.3		40	27.3		9.5		22	54.6	B
9.0		7 20	59.0		8.5		31 25	48.1	A	9.4		52	18.8		9.5		42	34.2		9.1		25	15.9	
9.4		32	7.0		9.4		37	59.3		9.5		58 30	19.3		9.4		45	24.6		9.1		19 36	20.9	A
8.0		9 7	32.5	F	8.1		32 47	59.8	B	9.5		45	47.3		7.6		57	20.2	A	9.1		20 4	36.5	
8.9		10 24	43.9	A	8.0		59	32.5		9.5	18	0 11	21.8		7.3		24 13	31.1	A	8.6		9	56.2	
9.5		43	53.2		9.4		36 58	28.0		8.7		1 19	4.1	A	8.0		14	10.8	A	9.5		21 20	11.4	
9.5		11 20	42.9		9.4		38 54	15.8		9.5		4 42	32.3	B	6.5		26 38	16.9	A	9.5		23 13	38	
9.1		12 35	13.8		8.5		40 8	46.7	A	9.0		6 9	1.4		9.4		27 13	49.9		9.5		24 24		
9.5		13 13	54.5		9.1		42 9	25.6		9.5		9 55	24.5		9.5		28 17	50.2		9.2		25 5[illegible]		
8.0		14 53	0.7	A	9.5		36	4.5		9.4		10 44	2.7	B	9.3		36	25.8	A	9.2		26 4[illegible]		
9.5		15 56	28.6		9.5		43 38	20.7		7.2		11 45	5.8	A	9.4		30 22	16.9		9.0		27		
9.4		19 35	44.2		9.1		46 7	31.0		9.5		12 19	37.1		9.4		38	41.1	B	9.0				
9.5		22 50	38.0		8.8		47 10	25.6	A	9.4		13 57	37.1		9.5		32 59	37.0		9.5		2[illegible]		

801—830						831—860						861—890						891—920						921—949					
	20u—21u			+76°			21u—22u			+76°			22u			+76°			22u—23u			+76°			23u			+76°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.5	20	28	14	30.4		8.9	21	15	44	0.6		9.3	22	26	15	1.0		9.5	22	56	29	36.6		9.4	23	24	43	16.9	
8.5			44	2.5	L	8.8			58	1.8	A	8.2		27	28	50.5	A	7.3		57	13	5.5	A	9.0		25	16	53.2	
9.5		31	20	59.7		6.0		17	18	24.0	A	8.7		28	34	16.1	A	8.2		58	2	8.3	A	9.0			16	49.6	A
9.1			30	48.7		9.5			55	36.2		9.0		31	26	37.3	A	9.5		59	0	30.2		8.5			28	45.1	A
8.8			50	20.4		9.5		18	46	20.5		8.7		34	13	50.9	A	9.0			35	58.6		9.5		28	13	2.0	
8.7		35	32	56.2	A	6.5		23	44	27.9	A	9.3			41	0.4		9.5	23	1	32	39.6		9.0		32	31	0.9	
9.4		38	40	59.6		9.5		24	50	38.2		9.5			46	46.5		9.5		4	13	14.0		8.8			36	38.1	A
9.5		40	40	6.5		9.5		28	45	23.0	B	9.3		36	27	15.1		9.5			34	50.8		3.5		33	26	49.5	A
7.1		41	1	18.8	B	9.5		29	7	25.7		9.4		37	44	7.3		9.5			41	3.8		8.5		34	37	33.4	A
9.5			5	45.0		8.9		32	9	10.7		7.5		38	57	51.0	F	8.9		6	8	23.3	A	9.5		36	16	31.8	
9.5			15	31.8		9.5			45	33.8		9.3		39	2	46.0		9.5		10	4	6.6		9.0		40	42	56.8	
9.5		43	45	16.1		9.4		35	19	31.3		9.0		40	33	51.0		9.5			12	35.1		9.5		41	3	12.6	
9.5		45	39	51.3		9.5			30	13.7		8.9		41	54	49.6	B	9.0			48	51.3		9.5		43	28	56.8	
9.5			48	5.8		9.5		37	10	36.2		8.5			59	26.5	F	7.8			58	0.5	F	6.9		45	3	47.8	B
9.5		47	35	22.9	B	9.5		44	30	23.4		9.3		42	7	48.4		9.0		11	57	15.0	B	8.7			48	52.8	A
9.5		48	11	42.1		9.4		46	36	42.0		8.7			50	34.8	B	9.5		13	40	0.3		9.1		46	27	2.9	A
9.5			12	38.1		8.5		50	32	1.5		9.3		43	24	28.6		9.5		14	16	50.2		9.5		47	7	36.1	
9.5		49	26	39.1		9.5		53	2	19.0		9.5		45	32	43.1		8.5		15	2	6.6	A	9.5			40	19.0	
9.5		53	50	53.4		8.0	22	0	25	37.6	A	8.5		47	7	17.6	A	9.5			26	0.8		9.5		48	13	10.1	
9.2		54	46	50.9		9.4		1	28	25.9		8.0			19	27.5	A	8.5			30	16.0	A	9.3		49	46	28.5	
9.5		57	25	25.9		9.5		3	27	3.2		9.4			29	6.4		8.0			43	15.9	A	8.3		50	30	45.6	A
9.5	21	1	5	26.8		9.5		6	7	47.0		9.5			50	27.5		9.5		17	53	33.1		8.6		51	31	29.0	F
9.3			59	44.6		9.2		10	12	36.7		9.5		49	4	4.3	A	9.2		18	23	41.0		9.4		52	17	17.6	
8.2		2	23	51.4	A	8.6			59	38.6		9.0		50	36	5.9	A	8.7			42	16.9	A	9.0			32	29.0	
9.5		3	2	28.3		9.5		18	15	58.2		8.3		51	23	44.3		7.9			53	43.4	A	9.5		53	33	15.7	
8.8		7	45	16.8		9.3			42	29.9		9.5		53	35	12.0		9.5		19	35	48.8		9.1			37	44.2	A
9.5		9	17	35.8		8.2			47	49.9	A	9.4			46	49.9		9.2		21	27	4.7	A	9.4			48	25.5	
9.5			23	16.0		9.5		23	18	23.3		9.3		54	0	48.7		9.5			31	27.2		9.0			57	49.6	A
9.5			32	43.0		7.3			26	41.6	G	9.5			49	28.3		9.5		22	36	54.9		9.5		59	21	28.5	
9.0		13	51	59.8		9.5			54	47.0		8.7			51	48.4	B	9.5		24	29	6.2							

Zone +77°

1—20						21—40						41—60						61—80						81—100					
	0u			+77°			0u—1u			+77°			1u			+77°			1u—2u			+77°			2u			+77°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.5	0	2	31	22.5		9.5	0	28	42	5.6		8.3	1	1	42	4.2	A	8.2	1	34	10	11.4	A	9.2	2	7	35	58.1	A
9.5		3	57	12.7		9.5		30	6	31.5		9.3		3	1	36.8		9.1		35	35	32.5		9.5		13	15	9.7	
9.5		6	0	5.8		9.4		37	16	11.5		9.3		4	22	33.3		9.1		39	4	26.7		9.5			45	53.5	
8.2		7	1	13.1	A	9.4			34	16.0		9.0		5	6	39.6	B	9.0		40	17	40.3		7.5		17	41	0.7	A
9.4		8	3	12.7		7.0		38	23	40.8	A	8.4			32	1.2	A	6.5			26	28.0	A	9.5		18	25	30.7	
8.9		13	3	41.0	A	9.1		39	5	3.2		8.5		6	10	52.1	A	9.1		42	57	11.5		8.6			34	51.0	A
9.5			13	4.3		6.7		40	32	9.7	A	9.5		7	29	10.5		8.5		43	0	12.9	F	9.5		19	39	26.4	
9.4			58	11.2		8.5			55	36.9	A	9.5		10	59	34.7		9.5			58	35.5		8.3		21	1	59.4	A
8.5		15	41	1.9	A	8.2		41	10	49.2	A	6.0		11	14	57.5	A	9.4		47	18	21.0		8.5			16	35.3	A
9.5		17	17	24.0		9.5		43	51	1.7		9.5			25	22.1		9.5			38	45.7		9.5		23	1	14.3	
9.5		19	12	59.7		8.7		44	35	17.0		9.5		15	15	23.3		9.5		48	7	2.2		9.5		24	11	44.1	
9.4			14	51.4		9.3		48	33	14.5		9.5		16	10	18.8		8.8			20	32.2		8.9			30	32.6	A
9.4		20	14	15.6		9.4			39	56.6		9.4		18	33	43.1		6.3			28	12.0	A	8.5		25	20	0.5	A
9.5		21	39	18.5		8.3		51	50	32.9	A	9.0			55	59.9		9.2		49	40	46.3		9.4			28	51.0	
8.8		23	28	18.9	A	8.5		56	2	33.4	B	9.1		23	36	23.8		9.5		55	51	18.4		8.1		27	56	58.4	A
9.5		24	10	51.7		9.3		57	40	40.3		9.2		25	25	24.8		8.7		58	38	13.5	A	9.4		31	5	8.5	
9.5		25	2	24.6		9.2		58	4	20.4		9.0		27	26	20.2	A	9.4	2	2	15	0.8		9.5		32	18	15.4	B
9.5			30	33.2		8.1			49	10.5	A	6.5			34	13.5	A	7.9		3	0	3.7	A	9.5		35	19	44.5	
9.5			52	33.4		9.5		59	37	16.4		9.0		30	22	56.8		7.9		6	5	35.2	A	9.2			19	7.5	
9.1		27	11	29.8		9.5	1	1	17	10.0		9.5		33	45	55.1		9.3			10	30.5	A	9.4		42	57	39.5	

101—160					161—220					221—280					281—340					341—400				
	2u—4u		+77°			4u—5u		+77°			5u—6u		+77°			6u—8u		+77°			8u—10u		+77°	
m	° ′ ″		′		m	° ′ ″		′		m	° ′ ″		′		m	° ′ ″		′		m	° ′ ″		′	
9.3	2 43	50	28.4		8.9	4 10	51	27.6	A	8.5	5 43	2	33.3	A	8.8	6 56	35	9.5		9.5	8 25	39	26.5	
9.3	44	40	15.7		7.8	11	30	17.7	A	9.3		5	0.2	A	9.5	7 0	28	49.4		9.1	26	51	21.1	
9.0	45	15	6.5		9.5	16	47	59.1		9.0	45	10	16.0		9.5	6	4	37.5		9.5	27	50	49.5	
8.1	46	32	31.4	A	9.5	17	55	9.8		9.4		55	31.3		8.5		53	46.2	B	9.5	28	8	0.4	A
8.5	49	37	58.9	A	9.5	22	28	15.7		9.5	47	23	32.7	A	9.4	8	37	53.3		9.1	39	20	14.7	
9.3	51	37	30.4	B	9.5	26	26	52.7		9.4	49	0	27.0		7.4	10	37	13.5	A	9.4		36	52.5	
9.5	52	17	20.3		9.1	28	12	28.3		9.5		7	36.3		9.3	11	9	19.7	B	9.5	40	4	30.8	
8.0		46	49.7	A	9.4	29	42	25.8		9.0	50	19	18.4	A	9.0		17	55.3	A	9.5		56	4.4	
7.0	55	15	37.9	B	9.5	30	8	59.5		7.5	51	14	17.9	A	8.9		57	20.7	B	9.5	42	15	15.2	
9.4		18	33.1		9.5		17	52.7		9.5	55	14	58.5		8.0	15	39	8.0	A	9.0	44	19	28.9	A
7.5	58	10	57.0	A	9.4		45	37.3	B	9.5		26	16.5		9.5	16	14	0.2		9.0	46	55	0.9	A
9.5		48	57.9		7.8	32	43	18.5	A	9.4	59	37	47.3		9.5	19	37	49.5		9.5	47	12	35.2	
9.5	59	27	42.2		8.3	35	31	20.7	A	8.9	6 0	5	1.2		8.2	22	55	5.1	F	9.5	51	26	31.9	
9.1	3 0	10	12.9		9.0	37	0	15.8		9.5	1	40	17.8		9.0	26	4	27.7		9.1		43	12.7	
6.2	2	11	10.9	A	8.7	38	3	11.7	B	8.5	4	58	32.3	A	9.5		47	19.5		8.7	52	16	41.1	B
9.0	3	28	26.0		9.5		34	41.8		8.1	5	59	18.0	B	9.5	28	3	50.6		9.5	53	55	36.1	
8.7	5	34	58.9	S	9.2	39	20	13.7		7.7	6	25	58.4	A	8.0		10	19.9	A	9.1	57	32	59.4	
9.5	8	44	39.7		7.5		27	31.4	A	9.5		53	33.3	A	9.5	32	18	58.4		9.5	58	20	9.2	
7.5		53	57.9	A	8.3	45	0	46.4	A	8.4	7	42	4.0	A	9.5	33	44	21.3		6.8	59	49	39.6	A
9.4	11	20	59.4		9.4		9	16.4	B	8.7		50	20.6	B	9.0		50	44.6		9.2	9 0	8	38.7	A
9.5	12	12	11.8		9.5	46	33	35.4		9.4	8	31	37.2		9.5	34	10	38.6		9.2		55	50.3	B
9.4		18	19.3		9.2	50	47	10.7		9.1	9	25	7.5	A	9.0	36	39	59.1	A	8.9	3	16	20.2	B
7.1		47	30.1	A	9.5	52	40	39.6		8.3	10	39	7.9	A	7.0	37	3	56.5	A	9.5	5	46	19.0	
9.3	16	5	51.3		9.5	53	30	53.7		8.8	11	52	46.6	A	9.1	40	31	55.1	B	8.3		54	49.6	A
9.3	17	10	55.7		9.5	54	46	53.1		9.4	13	20	33.6		9.5	41	49	55.7		9.5	6	10	20.1	
8.5	18	29	55.9	B	9.5	56	38	49.3		9.4	14	9	38.1		9.5	42	37	42.2		8.8	10	30	28.9	A
9.5		33	1.3		8.5	57	34	53.6	A	7.5		13	59.5	G	9.5	43	4	52.6		9.3		30	12.3	
9.4	19	41	20.0		9.2		37	14.7		9.1		25	48.5	A	8.8	44	31	12.0	A	9.1	11	39	43.8	A
9.3	20	46	10.7		9.3	5 1	44	12.0		9.5	17	6	39.7		9.1	45	42	10.0	A	8.7		55	46.8	A
9.4	21	59	20.4		9.5	2	35	29.5		9.1		6	35.6	A	9.5	46	20	54.1		8.5	14	3	40.9	A
8.4	25	29	34.5	A	9.3	3	27	24.3		9.5		52	59.8		8.7		43	30.4	A	9.4	15	11	52.6	
8.7		54	46.9	A	8.9	5	43	12.0		9.3	18	7	7.9		8.6	47	43	45.9	B	9.4	16	0	38.0	
7.2	29	0	39.1	A	9.5	6	30	23.2		9.2	22	30	17.9		8.0	51	57	3.0	B	9.4		34	19.7	
8.0	30	44	50.8	A	9.4		46	39.0	A	8.9	26	8	35.6	A	9.0	52	36	40.7	A	9.5	19	55	12.3	
9.0	36	57	4.4		7.0	7	11	50.2	A	8.7		44	31.2	A	9.5		41	30.4		9.1	21	57	29.9	
9.5	37	53	21.4	B	9.5	9	4	45.8		8.3	27	18	8.4	s	9.4	53	29	48.1	B	9.2	23	47	30.6	
9.1	40	44	21.8	B	9.2	11	47	5.7	A	9.4	28	30	32.0		9.4	54	16	23.4		9.5	25	28	29.6	
7.0	42	57	46.4	A	8.0	12	4	5.2	A	9.5	29	6	37.7		9.5	55	10	13.1	B	7.8	27	47	52.1	A
9.5	43	41	1.9		8.5	13	45	49.2	A	7.8	30	48	21.7	A	9.3	56	49	13.9	B	8.4	30	27	22.6	A
9.4	45	19	18.2		9.2	14	0	17.5		9.5	33	8	36.1		9.5	57	39	36.2		8.8	31	35	45.3	A
8.9	48	3	40.8		8.3	19	36	26.2	A	9.4		53	39.7		9.5		50	24.0		9.4	32	10	2.0	A
9.5	52	5	48.2	A	9.5	20	38	12.1		9.2	34	4	59.8		8.8	59	40	33.6	B	9.5		50	7.0	
8.7		52	59.1	A	9.5		46	26.8		9.5	36	13	18.2		9.5	8 0	16	47.3		9.4	34	46	19.7	
9.5	53	2	54.1		9.5	21	6	30.8		9.4		26	29.6		9.5		18	32.1		9.2	35	45	34.2	
8.4		24	58.6	A	8.2		8	1.6	A	9.5	37	33	19.0		9.1		1	19	53.6		9.1	36	7	59.1	
9.4	54	53	20.2		9.0		33	37.9		4.7	38	50	9.2	A	9.5		2	2	54.2		9.2	37	51	39.1	
9.5	55	38	44.9		8.8	24	40	31.3	s	9.5	39	55	35.2		7.0		5	44	25.0	A	9.5	40	16	6.0	
9.5	56	2	40.7		9.0		49	15.0		9.0	40	4	48.4	A	9.3		6	28	40.0		9.3	41	28	9.9	
9.5	57	15	42.0		8.8	25	6	1.2		9.0		29	26.4	A	9.5		7	15	43.7		7.4	42	58	17.7	A
7.0	59	17	41.8	A	9.3		8	37.2		9.5	47	38	29.2		7.7		10	19	31.5	A	8.3	44	7	57.2	B
9.5	4 0	56	35.5		9.0	26	48	58.0		9.0		39	36.3		9.5		12	51	41.7		9.5	47	23	19.5	B
9.5	1	41	29.9		8.9	27	2	10.0	A	9.0	48	1	55.9	B	9.5		13	23	49.2		9.0	50	28	6.4	
9.5		47	39.4		9.5	28	17	39.4		8.9		25	23.0	B	8.7		57	56.1	A	9.0	52	42	19.9	
8.8	4	57	40.2	A	9.5	29	22	3.3		9.5	50	5	24.3		9.5		14	46	6.8	9.5	56	24	19.2	
9.5	6	20	51.3		9.0	31	35	6.2	A	9.5		48	0.6		9.5		16	18	11.6	8.8	57	11	3.0	
9.4		26	15.2		9.2	32	47	47.7	A	8.5	52	53	16.4	A	9.5		17	40	49.6	9.5	58	36	44.4	
9.5	7	1	59.1		8.5	33	12	52.1	A	9.2	53	2	52.1	A	7.2		18	24	30.5	A	8.9	10 0	32	59.6	
9.4	8	31	39.4	B	9.4	36	54	48.0		9.4		4	45.3		9.5			56	35.5		9.2	7	7	41.5	
9.5	9	55	39.6		9.4		55	49.0		9.5	54	5	8.9		9.5		19	37	26.0		9.0	11	2	23.1	A
9.2	10	41	52.7		9.5		37	12	22.3		9.0	55	55	1.7		9.5		25	16	18.9		9.1		36	20.5	

401—460					461—520					521—580					581—640					641—700				
	10u—11u			+77°		11u—13u			+77°		13u—15u			+77°		15u—16u			+77°		17u—18u			+77°
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
9.0	10	13	36	3.0	5.8	11	57	54	43.3	A	9.3	13	43	31	58.5		9.5	15	19	56	29.6		6.5	17	3	4	52.0	A
9.5		16	19	12.4	8.0	12	1	42	5.9	A	8.9		46	29	53.0		8.2		20	59	42.2	A	7.8		7	31	48.5	A
9.3		21	21	24.5	B	9.4		5	32	37.9		7.3		54	20	12.1	A	9.5		21	52	8.8		9.5		42	57.4	
7.8			54	28.5	B	9.4		7	6	56.1		9.4		40	58.6		9.1		24	7	37.9	A	8.8		12	2	24.1	
8.3		26	49	11.6	A	9.4		8	58	4.9		9.5		55	55	43.9	8.0		25	38	9.3	A	9.5			26	17.0	
8.0		28	35	58.9	A	9.5		9	57	1.0		9.4	14	0	34	17.3	9.5		28	5	55.3		8.2		13	26	28.6	B
9.4		30	7	36.2		9.5		10	44	21.6		9.4		3	22	31.2	9.2		30	13	23.8		9.2			55	58.4	
9.5			47	51.5		9.4		13	55	51.2		9.0		4	12	22.3	A	9.5			35	53.6	B	9.3		14	12	35.5	
9.3		34	20	50.1	A	8.9		14	25	0.0		7.8		5	23	40.4	A	9.5		32	10	39.5		9.5			20	24.8	
8.3		36	59	37.5	A	9.4		15	14	36.9		9.5		9	13	55.9		9.5		34	3	13.0	A	9.5		16	8	2.0	
9.4		40	32	28.9		9.3			26	38.5		8.8			44	50.7	B	9.0		35	8	18.1	A	9.0			27	50.0	
6.8		43	23	51.5	A	8.8		17	58	55.5	A	9.5		11	41	47.5		5.0			46	51.0	A	9.5		19	45	54.2	
9.5		45	33	40.2		9.5		18	51	23.1		9.5		12	13	11.9		7.8		36	17	14.8	A	8.5			55	3.2	B
9.5		48	3	41.2		8.1		20	35	11.2	B	9.1			30	7.0		9.4		38	29	20.6	B	7.5		21	12	30.1	A
9.5			7	12.1		7.5		25	17	29.4	A	9.3		17	53	11.9		8.0		39	14	18.4	A	9.5		22	23	25.9	
9.5			15	50.9		9.4			32	2.6	B	9.1		18	20	27.6	S	9.4			23	22.6	B	9.2		23	43	37.5	B
8.5			48	24.4	A	9.5		31	3	12.8		9.3			28	30.2		9.4			56	54.4		9.5		25	1	15.3	
9.4		49	35	37.9		8.3			11	25.7	A	9.4			54	3.5		9.3		41	50	1.3	A	9.4		28	27	51.3	
8.4		54	14	13.6	A	9.5		32	49	18.7		9.5		19	37	47.5		9.3		42	11	40.3		9.2		31	15	16.1	B
9.5		56	40	28.1		9.2		35	24	29.8		8.5		20	25	21.8	A	8.5			33	24.7	A	9.1		32	24	30.8	
9.5			57	33.5		9.5			28	14.0		8.9		23	39	20.1	A	9.2			55	34.1		8.3			37	13.7	A
9.2		57	55	42.9		9.4			33	47.2		9.3		25	31	13.3		9.4		43	21	41.8	B	9.2		33	32	25.5	A
9.1			58	12.6		9.5		37	48	18.0		8.9		26	9	28.6	A	9.5		44	25	0.1		9.5		37	26	0.1	
9.2		58	54	49.6		9.5			51	24.9		9.1		27	10	17.3	G	9.5			27	13.8		9.2			55	11.4	B
9.3	11	1	46	59.2	A	9.3		38	22	33.1		9.2		28	49	43.8	B	9.1			39	33.0	A	9.4		38	3	0.7	B
9.0		6	44	30.3	A	9.5		40	26	35.1		9.0		29	45	2.5		9.1		46	22	30.0		7.8			46	25.9	L
9.5		7	54	47.8		9.5		43	20	31.2		9.0		30	21	59.7		8.3		48	17	39.3	A	9.4		46	42	51.3	
9.5		10	4	48.9		9.5			56	17.5		8.2		32	12	11.9	G	8.5			48	20.1	B	9.5		49	30	46.9	
9.5		11	37	44.5	B	9.0		46	42	23.3		9.5		34	10	40.0		7.8		49	19	34.3	A	8.8		52	19	58.7	
8.9			54	0.0	A	9.5		48	54	20.4		9.4		40	53	51.9		9.5			56	54.4		7.5		54	50	3.4	A
9.5			58	43.0		7.7		49	36	43.6	A	9.4		42	30	13.3		8.0		55	50	42.1	A	9.5		55	1	26.3	
8.3		12	16	51.7	A	9.3			46	59.4	B	9.5		43	48	0.2		9.4		58	58	15.7		9.5			53	34.7	
8.5		13	52	7.4	A	9.2		50	30	41.6	A	9.2		44	21	31.6		9.3		59	8	34.5		9.5		57	20	54.3	
9.0		15	25	50.2	A	9.5		52	42	6.2		9.4			35	25.2		8.7	16	5	44	33.6	A	9.2		59	25	7.5	
9.1		19	44	11.4	A	8.5			58	59.7	A	9.4		45	9	30.7		9.5		7	15	45.2		9.0	18	0	5	23.3	A
9.3		21	53	21.0	B	9.5		54	20	29.3		9.5			22	56.2		6.0		8	30	10.8	F	9.5		8	33	50.5	
9.3		27	39	27.5	A	9.5			38	47.6		9.2		46	56	20.8		9.5		9	37	14.7		9.5		9	49	0.2	
9.4		29	18	7.4		8.8		56	7	13.3	B	9.5		47	35	22.6		9.5		12	32	6.8		8.8		10	14	5.6	
9.3		30	15	50.3		9.5		59	12	33.3		9.5		48	51	14.7	B	9.3		13	37	21.7		8.1		11	6	27.6	
8.6		38	56	51.3	A	9.4			35	15.3	A	9.0		49	32	25.2		9.4		16	42	26.6		8.2		13	58	54.9	A
8.5		39	16	1.6	A	9.3	13	2	40	4.0	B	9.5		50	16	8.5		9.5		21	6	40.3		7.5		14	40	32.8	A
9.5		40	10	49.3		8.7			51	4.2	B	9.4		55	42	5.1		9.4		24	15	57.8		8.5		15	2	30.8	A
9.5			46	23.0		9.3		3	19	22.1		9.4		56	48	9.0		7.5			38	53.3	F	8.8			35	12.2	
9.5		41	23	13.2	B	9.5		7	9	59.4		9.4		57	1	27.9		9.0		25	54	1.0	B	9.5			52	32.7	
9.5		42	0	13.0		8.3		9	24	3.0	B	7.7	15	1	0	6.4	A	9.1		28	22	26.6		9.3		17	4	24.8	
9.4			24	40.4		7.6			25	57.8	B	9.5			41	11.7		9.4		35	51	40.6	B	9.5			15	13.7	
9.2		44	40	47.9	A	9.5		16	28	32.3		9.2		2	22	47.9		6.5		36	54	43.1	A	9.0			21	8.5	B
8.9		47	10	40.0		9.3		21	27	22.6		8.7		4	32	51.4	A	7.8		39	53	58.4	A	9.5		18	20	29.4	
9.5		48	41	47.4		8.3			54	2.5	A	9.5		5	8	7.8		8.2		41	1	55.4	A	9.5		21	9	31.0	
9.5		50	13	46.9		8.4		22	22	40.3	B	9.5		6	44	57.1		8.0			11	23.3	A	9.5			47	48.5	
8.8		51	1	29.5	A	9.5		26	37	30.7		7.8		7	26	54.8	A	8.8		42	9	53.4	A	9.5		22	25	33.4	
9.4		53	2	53.2		9.5		27	50	32.0	B	8.3			36	12.3	A	8.5			40	29.9	A	9.2		23	34	4.3	
9.4			25	37.5	B	9.5		28	42	22.1		9.1		8	5	20.7		8.8		45	19	55.4		8.0		24	20	2.3	L
9.3			48	25.1	A	9.5			59	49.1		9.2			39	7.9	A	6.0		49	36	44.6	G	9.5		27	32	34.3	
9.5		54	37	37.6		7.5		31	59	2.4	A	9.2		10	2	4.9		9.2		52	12	16.2		8.5		28	25	42.6	A
9.5			54	37.0	B	6.0		32	50	17.7	A	8.4		12	30	42.4	A	9.3		55	27	22.5		7.7		31	16	28.4	A
9.5		55	7	42.7		9.2		34	44	2.8	B	9.5			54	23.7		9.4		57	10	57.4		8.5		33	52	2.3	A
8.8		56	38	8.9	A	9.0		39	1	35.6	A	8.9		13	10	32.4	A	9.4			38	16.4	B	9.0		36	10	8.7	A
9.5		57	41	26.3		6.2			18	34.0	A	9.5		15	6	34.7		7.2		58	42	4.4	A	6.5			48	25.4	A
7.4			44	34.5	A	9.4		42	31	41.6		9.5		17	29	15.7	A	9.4		59	42	26.3		9.3		37	50	47.7	

701—748					749—796					797—844					845—892					893—937				
	18ᵘ—19ᵘ		+77°			19ᵘ—20ᵘ		+77°			21ᵘ—22ᵘ		+77°			22ᵘ—23ᵘ		+77°			23ᵘ		+77°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
9.4	18	42 28	47.6		9.3	19	54 22	37.3		9.3	21	1 46	37.4		9.5	22	2 55	46.0		9.3	23	8 22	39.6	
7.0		44 29	32.3	A	9.0		49	36.9	B	9.5		3 25	38.4		9.5		4 12	36.9		8.3		25	15.9	A
9.3		46 23	20.9	B	9.5		57 4	1.6		9.5		6 15	12.5		9.5		5 0	13.4	B	8.4		9 55	9.0	A
9.5		48 49	48.1		9.5		58 28	23.6		6.1		8 25	31.6	S	9.5		13	8.2		7.3		11 52	21.7	F
9.5		50 7	41.6		9.5	20	0 58	28.6		9.1		10 31	48.7		9.5		24	10.1		9.5		14 14	37.7	
9.5		51 7	53.4		9.5		59	37.0		9.3		57	42.3		9.5		7 12	38.5		9.4		29	27.2	
9.5		46	49.2	B	9.2		3 10	56.9		9.5		13 8	58.0		9.1		53	41.0		9.3		15 5	4.1	
9.4		52 40	59.8		9.5		44	37.1		9.5		20	27.3		9.5		9 4	25.1		8.9		26	47.0	A
9.4		55 35	35.4	B	9.3		5 19	26.6		9.5		55	31.5		9.5		12 37	24.7		9.5		17 3	39.1	
9.3		48	58.4		9.1		7 11	15.3		9.4		15 22	23.8		9.5		14 40	48.4		9.5		58	33.5	
9.3		59 52	18.1		8.4		50	29.0		9.3		16 40	19.0		9.5		15 59	21.1		9.5		20 1	15.9	
9.5	19	5 21	27.9		9.5		9 31	57.6		9.5		17 9	38.8		9.5		16 26	31.4		9.3		12	48.9	A
9.4		6 12	50.2		8.0		11 10	7.5	J	9.3		17	14.5		9.5		17 28	53.0		9.5		21 42	51.9	
9.5		7 5	25.7		7.7		12 57	24.6	A	9.2		18 10	2.8		9.5		56	15.0		9.5		23 22	4.6	
7.3		8 29	26.9	A	9.5		13 19	19.0		7.0		23	59.2	A	9.5		21 3	54.2		9.2		24 17	38.6	
9.5		10 28	59.0		4.8		45	15.8	A	9.5		29	59.4	A	6.8		22 27	29.8	L	7.0		25 9	5.3	A
8.5		12 30	11.4	A	9.4		14 56	17.5		9.5		21 53	13.4		9.5		23 7	42.5		6.8		26 12	0.1	A
9.5		13 48	5.5		9.5		15 31	51.9		9.5		56	14.9		8.8		25 57	37.0		9.5		27 28	12.4	
9.4		15 17	49.2		9.5		38	16.5		9.5		22 4	47.3	B	8.0		26 10	49.0	F	9.5		31 29	42.5	
9.2		32	40.3		9.5		19 25	45.6		9.3		12	27.0		9.5		30 55	7.2		9.5		32 4	10.4	
9.5		17 54	22.3		9.5		20 37	12.0	B	9.3		33	16.1	B	9.3		33 33	58.8		9.3		33 16	1.1	
9.3		21 19	8.3		7.8		39	33.7	A	9.4		23 24	19.5		8.5		45	28.8	A	9.0		34	4.0	
9.2		22 28	12.3		9.5		21 5	45.6		9.2		26 44	15.9	A	8.8		36 9	45.1	A	9.3		51	52.5	
9.5		25 2	48.3		9.5		23 46	57.4		9.5		27 32	1.2		8.1		38 24	16.0	F	9.5		34 21	56.5	
9.4		26	9.5		9.5		25 12	39.1		9.5		28 19	30.0		9.4		39 40	5.2		9.5		35 8	27.9	
9.5		27 17	45.9		9.2		33	13.7	B	9.2		29 27	51.6		9.5		44	36.2		9.5		27	7.6	
9.5		19	36.5		9.5		26 24	8.2		7.2		30 17	17.6	A	7.2		41 30	44.5	A	9.5		36 11	58.9	
7.8		29	52.6	A	9.0		54	33.3	A	9.4		34 45	58.5	B	9.4		51	28.2		9.5		21	32.8	
9.5		28 10	9.0		9.2		27 42	42.1	A	9.5		47	49.2		9.5		44 11	33.7		9.5		38 28	6.6	
8.3		29 41	36.5	A	9.5		29 56	45.1		9.4		36 29	16.0		9.1		26	53.2	A	8.9		39 5	45.1	B
9.5		30 9	47.0	B	9.1		31 41	4.6	A	var		55	58.7	B	9.4		37	7.1		9.3		40 16	31.7	
8.2		50	50.3	A	8.5		32 50	49.5	A	9.5		40 59	33.7		9.5		45 58	11.1	B	9.5		41 27	35.7	
9.5		35 32	38.0		9.5		34 15	26.6		9.5		41 1	47.7		8.0		51 18	4.2	B	9.5		44 27	57.5	
7.0		36 12	56.6	A	8.8		19	15.0	A	9.5		59	25.2		9.0		52 20	41.0		8.9		38	15.5	A
9.5		58	11.9		9.5		36 17	12.5		9.5		43 24	17.0		7.3		53 42	43.5	S	9.3		45 31	4.7	
7.8		39 52	43.8	A	9.0		34	45.1		8.7		56	34.6	A	9.5		57 32	12.9		9.5		47 36	49.0	
9.4		40 55	35.1		9.5		37 24	11.9		9.5		46 22	18.2		9.5		58 10	41.1		7.8		48 46	6.8	B
9.2		42 32	4.1		9.5		56	39.2		7.0		45	33.6	B	9.4		59 23	56.3		9.5		52 38	30.2	
9.5		47	50.3		9.5		39 58	37.7		9.5		50 2	38.0		9.5		39	28.5		9.5		53 8	29.7	
9.5		46 8	4.1		9.5		42 49	10.5		7.5		59	4.6	F	9.3		49	12.9		9.5		13	33.1	
9.4		17	9.0		9.5		43 9	49.5		8.5		52 50	39.4		8.5	23	0 30	44.0	B	9.1		55 24	24.5	
9.5		47 54	36.5		9.5		39	38.3		8.6		53 33	50.6		9.2		37	32.0		9.5		56 3	11.7	
8.3		49 20	9.5	L	9.5		52 17	35.7		9.5		55 10	27.6		9.4		46	11.9		9.2		3	55.9	A
9.5		27	17.4		9.4		47	15.9		9.5		56 13	26.8		9.5		49	57.4		9.2		58 11	55.5	A
9.4		50 37	39.2		8.0		55 36	38.7	A	8.7		59 33	27.3	A	9.5		55	41.0		9.4		59 0	41.7	A
8.9		51 41	35.3	B	9.5		56 13	38.0		9.5	22	1 26	47.5		9.5		1 5	8.5						
9.4		53 42	22.0	B	8.0		57 33	40.2	A	9.5		31	40.5		8.5		3 4	7.0	A					
9.4		45	40.0		8.9		59 3	59.9	A	9.5		52	27.7		9.4		10	48.5						

Zone +78°

1—40					41—80					81—120					121—160					161—200				
	0ᵘ—1ᵘ		+78°			1ᵘ—2ᵘ		+78°			2ᵘ—3ᵘ		+78°			3ᵘ—4ᵘ		+78°			4ᵘ—5ᵘ		+78°	
m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′		m	ᵘ	′ ″	′	
6.5	0	1 28	54.8	A	9.3	1	12 28	55.0		8.5	2	8 27	1.6	A	9.1	3	14 17	9.3	B	8.1	4	23 25	51.6	A
9.5		4 55	5.8		8.4		58	30.0	A	8.0		54	53.7	A	9.4		16 11	10.9		8.4		24 15	3.4	A
9.5		6 50	7.2	A	9.5		15 50	40.8		7.9		54	59.1	A	8.9		17 12	48.3	B	9.4		26 14	4.1	B
9.5		50	41.4		9.0		17 50	55.0		9.4		11 10	45.1		9.5		20 0	26.2		9.5		55	27.1	
9.5		9 29	47.3		8.5		18 47	24.2	A	9.3		12 22	14.1		9.4		43	9.5		9.5		27 1	9.9	
9.5		54	11.0		9.5		22 4	46.4		9.5		13 12	12.1		9.2		22 21	18.2	B	9.5		31 52	39.4	B
9.4		54	39.1		9.5		35	14.4		9.2		15 11	37.2		9.5		23 50	20.7		9.5		34 11	20.2	
9.5		10 3	58.0		9.5		36	18.0		9.4		17 19	20.9		9.4		24 32	12.8		9.5		20	1.0	
9.5		12 38	39.5		8.5		47	24.8	A	9.5		54	17.0		9.5		26 33	9.0		9.3		30	8.5	
9.5		15 18	20.8		9.3		48	24.4	A	9.4		18 16	42.8		9.0		27 14	13.9		9.5		39 49	23.0	B
8.6		24	43.7		9.5		25 59	47.5		9.3		20	34.8		9.3		28 46	41.2		9.5		40 4	26.5	
9.4		17 22	43.3		8.0		28 15	35.7	A	8.6		59	56.8	A	9.5		32 5	0.6		9.5		26	25.2	
9.3		18 12	29.6		9.5		29	36.5	A	9.0		21 7	35.7		8.9		33 5	27.5		9.1		42 14	19.6	A
9.5		20 15	30.0		9.1		31 7	4.3		8.5		23 15	53.5	A	9.3		30	20.2		8.9		43 17	14.8	A
9.5		22 4	55.3		9.0		32 15	59.0	A	8.0		26 50	33.8	A	9.4		40 59	41.7		9.4		42	7.9	A
9.5		57	31.5		9.5		25	49.7		9.2		27 2	34.7	A	8.8		41 23	34.5	A	9.5		45 13	47.2	
9.1		25 46	27.3		9.5		33 29	19.5		9.4		34 9	55.7		8.7		42 34	37.8	A	8.7		46 25	51.7	A
9.5		28 57	15.7		9.4		34 50	56.0		8.0		35 27	4.0	A	9.0		43 46	37.5		9.0		57 14	37.9	
9.2		29 49	17.7	B	9.5		35 1	35.8		8.7		36 29	27.3	A	9.5		45 5	52.1		8.8		52	52.4	A
9.5		32 6	10.9		9.5		38 39	39.8		9.4		42 38	14.1		9.2		27	42.3		8.0		58 14	11.3	A
8.0		48	23.6	A	9.2		42 38	48.1		9.5		45 34	7.7		9.3		33	29.5	B	9.4		59 13	26.8	
9.5		34 54	56.9		8.3		43 46	59.7	F	9.4		46 50	20.8		8.0		47 48	32.3	A	9.3	5	0 13	25.0	
9.5		40 42	42.2		8.5		44 29	38.0	B	5.6		47 5	50.7	A	8.5		48 35	1.5	B	6.8		3 25	16.2	A
9.5		57	18.7		9.3		45 35	56.5		8.9		10	27.6	B	8.8		52	25.6	A	9.0		4 15	41.7	A
9.3		43 27	59.0		9.3		46 47	59.8		9.5		51 25	9.2		8.4		50 23	8.4	A	8.9		19	48.6	A
9.4		46 27	32.9		8.1		47 35	10.9	F	9.0		54 14	52.0	A	7.2		37	38.3	A	9.4		5 33	13.1	B
9.1		49 48	4.5		9.0		48 18	25.6		9.5		55 38	11.6		9.5		51 42	57.6		7.0		6 7	7.8	A
8.1		50 59	37.3	A	9.0		50 47	4.8		9.0		56 29	53.3	A	9.5		53 43	8.0		9.3		7 53	49.1	A
9.1		51 18	47.2		7.3		53 12	38.3	A	7.0		58 19	19.0	A	9.5		54 36	52.6		9.4		10 27	37.3	
9.2		52 28	59.9	A	8.9		55 11	17.1	A	9.0	3	1 40	5.3		9.0		58 2	14.8		7.7		11 27	11.7	A
9.2		53 23	18.6	A	7.3		56 12	59.5	F	9.5		4 9	22.4		8.2	4	0 10	38.3	F	9.5		58	58.3	
9.5		55 43	18.7		9.5		30	20.5		9.4		5 2	22.9		9.4		3 6	39.8		9.0		13 35	28.9	A
8.8		58 7	49.1	A	7.3		59 53	29.0	A	9.4		20	9.7		9.3		8 55	4.5		7.7		15 6	15.1	B
5.6		59 59	54.3	A	9.3	2	0 52	2.6		9.5		8 40	12.0		9.4		9 40	55.7		9.4		17 19	52.5	A
9.5	1	5 54	54.0	B	9.5		3 30	45.0		9.5		9 10	8.7		9.5		13 35	34.1	B	9.5		18 25	2.0	
7.5		9 20	15.1	A	9.5		42	34.7		9.5		10 4	15.0		9.4		50	46.2	B	9.5		43	36.3	
9.5		54	31.5		9.5		4 8	13.1		9.2		12 57	12.8	B	7.5		15 28	40.8	A	8.2		23 27	9.9	F
9.4		59	49.5		9.0		57	59.6	A	9.4		13 36	44.5		9.3		16 46	34.9		9.5		25 58	22.0	
9.4		12 15	55.5		9.3		5 50	14.5		9.4		39	37.5		9.5		18 35	12.8		9.5		29 18	14.8	
8.3		26	20.1	A	8.7		6 36	36.7	A	9.1		14 11	10.8		9.3		22 31	54.5		9.5		41	12.8	

201—260					261—320					321—380					381—440					441—500				
	5ᵐ—7ᵐ			+78°		7ᵐ—9ᵐ			+78°		9ᵐ—11ᵐ			+78°		11ᵐ—12ᵐ			+78°		12ᵐ—14ᵐ			+78°
m	ᵐ	′	″	′	m	ᵐ	′	″	′	m	ᵐ	′	″	′	m	ᵐ	′	″	′	m	ᵐ	′	″	′
9.5	5	30	25	5.5	9.5	7	24	20	7.8	9.1	9	32	56	29.5 A	8.5	11	7	2	5.5 A	9.5	12	49	13	7.3
9.5		32	34	32.4	9.0			58	35.0 A	9.2		34	49	35.4 A	9.3		8	10	9.9 A	9.5		50	13	54.9
9.5		33	11	7.8	9.5		26	1	38.3	9.5		35	12	54.0	9.3		10	21	58.2	9.5			15	22.8
9.2		36	57	13.5	9.5		28	29	46.6	9.5		36	22	36.9 A	9.4			36	32.2	9.5		55	14	41.5
9.5		37	42	48.2	9.0			49	41.3 B	9.4		39	40	51.0 B	6.8		12	50	10.8 F	9.4		57	13	19.5
9.3		43	39	54.3 B	9.5		29	16	28.7	9.5		40	40	34.0	9.5		15	31	30.0	8.5	13	0	55	12.6 A
9.5		44	1	41.2	9.5			16	27.8 B	7.1		41	0	37.0 B	9.0		21	46	56.6	8.0		2	35	27.8 F
9.5			12	51.3	9.3			43	32.2 B	9.5		42	18	14.2	9.4		22	42	7.5	9.5		4	17	29.3
8.5		46	25	0.5 A	9.4			56	39.5 B	8.9		44	57	30.6 A	9.5		26	3	11.3	9.2			45	24.9
9.0		47	13	57.6	8.0		30	18	34.6 A	9.5		45	47	7.5	9.5			22	13.8	8.8		7	4	42.1
8.5		49	53	32.7 B	9.5		36	20	23.5	9.5		46	28	2.0	9.4		27	31	3.0	8.7			13	48.5 F
9.5		51	5	22.5	9.5		38	15	41.0	9.0			59	29.5 A	6.2		28	32	23.6 A	9.3			39	49.0
9.1			10	59.4 A	7.7		39	26	0.9 A	9.4		47	9	8.1	8.9		29	24	16.8 A	9.0			51	24.4
8.5			47	54.6 A	9.0		42	46	35.8	9.5			9	17.9	9.5		31	59	48.6	9.3		9	29	15.1
9.5		52	27	39.7	8.5		44	58	39.2 s	9.5		48	39	40.4	9.4		32	12	40.7 A	8.8			55	37.8
9.0		54	13	47.2 A	9.3		46	25	22.9	9.4		54	17	16.3	9.5			45	16.3	9.5		13	42	38.2
9.5		55	1	56.4	9.5		47	26	17.6	8.5		56	19	10.0 A	9.4		40	1	35.0	9.0		16	51	35.3 B
9.3		59	4	5.0	7.5		50	44	1.9 A	9.2		57	51	37.1	9.5		44	23	41.8	9.4			53	40.2
8.0			59	26.7 A	9.5		55	24	56.2	9.4		59	8	29.1	9.5		46	55	18.4	9.4		19	7	35.5
8.1	6	2	29	50.5 A	9.5		57	16	59.9	8.8	10	3	31	10.0 A	9.5		49	47	46.8	9.5		23	17	38.8
9.0			45	52.0 A	9.5		58	26	54.8	9.4		4	44	23.2 A	9.0		51	39	49.7	9.5			54	33.8
9.5		4	17	54.4	9.5	8	3	0	44.2	9.5		5	2	39.9	9.2		52	48	41.8 A	8.3		24	22	27.8 A
9.5		5	16	7.7	9.4			58	5.6 B	9.5			50	23.7	9.5		54	0	47.8	9.5		35	48	48.1
7.8			56	2.0 A	7.5		4	24	23.0 A	9.4		9	39	14.7 B	8.8		55	21	30.0 B	8.0		36	53	37.7 A
7.5		6	22	21.0 A	9.3		6	24	38.2	9.5		10	36	12.2	9.4		58	12	51.6	9.4		41	40	23.4
7.5		10	32	16.6 A	9.5		7	44	19.1	9.5		13	46	19.3	7.0	12	2	55	11.7 A	5.8		42	6	47.4 B
6.0		18	1	6.8 A	6.8		10	35	41.2 A	9.5		14	22	30.0	9.2		3	11	10.3 A	9.5		48	17	20.0
9.5			56	22.4	9.0		18	11	49.0	9.5			55	40.4	9.3			25	17.2 A	9.1		49	18	56.9
9.5		19	5	41.5	9.5		19	14	13.2	7.3		18	34	14.3 A	9.0		4	0	13.7 A	9.5		51	35	33.0
9.5		22	52	37.7	9.5			55	36.3	9.5		19	54	12.0	9.0			40	20.1 A	9.5		53	33	40.3
9.2		23	49	41.1 A	7.0		29	3	12.1 A	9.5		20	2	45.3	7.3		5	2	14.7 A	9.1		56	9	9.9
9.4		24	49	47.6 A	8.6			53	20.4 A	9.4		22	24	51.2	5.1			25	25.5 A	9.5			48	44.5
7.8		30	9	14.1 A	6.5		31	27	41.5 A	9.5		23	58	37.8	9.5			34	59.6	9.5		59	14	35.0
7.3		31	47	9.6 A	9.5		38	0	19.9	7.8		24	5	50.5 A	9.5		9	26	21.6	9.0	14	1	46	44.4
9.5		38	36	17.0	9.5			17	32.2	9.2			47	15.1	9.4		10	23	11.2	9.5		4	17	26.7
9.4		40	25	29.2	9.5			45	51.4	9.5		26	58	20.8	9.0		11	41	21.0 A	9.1			47	46.8 A
9.5		46	58	44.0	6.9		39	22	41.5 A	9.0		29	6	38.3	9.3		17	27	12.7	9.3		8	17	48.8
9.5		48	13	45.0	9.0		48	4	5.3	9.1			9	11.2 A	9.4		19	23	32.4	5.0		9	29	13.9 A
9.5			57	36.1	9.5		50	36	47.0	7.0		30	24	11.2 A	8.7		20	49	9.4 A	9.5		13	17	25.4 B
6.7		50	40	58.6 F	9.4		56	14	42.9	9.5		36	19	18.6 A	9.0		21	7	44.6 A	9.4		17	38	28.6 A
9.5			46	26.2	9.0	9	0	38	2.3 A	9.5			37	48.5	9.0			11	51.5 A	9.5		18	57	32.1 A
9.5		52	30	44.5	9.0		1	1	54.3 A	9.3		41	0	29.8 A	9.4		24	28	17.2	9.5		20	29	35.0
8.0		57	58	0.3 A	7.9		2	4	33.6 A	8.6		42	47	26.9 A	9.0		26	22	32.5	9.3		21	29	9.4
9.5		59	4	50.3	9.0			58	0.8 A	9.5		45	25	1.4	9.3		27	8	20.1	9.2			44	27.1 B
9.4			8	9.6	9.5		4	19	42.1	9.2			38	33.8 A	9.3		28	22	57.9 A	9.1		25	7	0.8
7.0	7	0	53	9.6 A	9.5			48	9.2	9.5		46	40	22.4	9.2		30	3	53.1 A	9.5			50	47.8
9.5		1	15	38.1	9.4		7	42	48.0	6.2		48	12	33.2 A	9.2			38	4.9	9.4		34	52	1.2
9.3		2	26	0.3	9.5		10	50	37.4	8.0			35	27.4 A	9.0			49	22.0 A	9.2		36	43	52.5 A
9.2			38	55.1	9.2		15	59	50.4 B	9.4		50	27	42.3	9.4		38	8	59.9	9.4		37	42	31.0
6.5		3	11	30.7 A	8.2		16	58	19.6 A	9.5		51	37	58.1	9.5			56	10.7 A	9.5		41	37	51.3
7.0		4	11	18.6 A	9.5		17	49	25.5	9.2		52	41	22.6 A	9.5		40	38	5.8 A	9.4		43	23	27.7
9.5		5	50	37.1	8.7		20	45	52.8 A	9.5		55	38	51.1	9.5		41	3	45.0 A	9.5		44	16	9.0
8.7		7	45	29.7 A	9.5		21	53	33.4	9.5			44	18.3	8.9		42	39	36.2 A	9.5		45	42	56.2
6.8		10	24	59.6 A	8.8		23	23	1.7 B	9.5		56	40	58.2	9.1		43	17	41.5 A	9.5		46	39	51.8
9.5		11	19	19.5 B	8.2		25	55	11.8 A	6.5		58	55	34.4 G	8.7		45	53	16.8 B	9.4		48	23	1.2
9.5		16	36	3.1	9.4		27	12	44.6	9.5		59	46	50.6	9.2		47	31	24.3	9.5		53	36	34.5
9.5		18	10	45.0	6.8		28	50	47.4 B	9.5	11	1	12	51.6	9.3		48	14	8.6 B	8.4			52	4.6 A
9.1		22	20	32.0	9.5		30	34	58.5	8.0		2	28	24.1 A	9.4			58	8.4	8.0		54	25	0.2 A
9.0			24	11.0 S	9.2		32	13	6.4	9.5		3	26	38.0	8.9			58	28.7	9.5		55	10	1.7
9.2		23	20	5.9 S	9.5			48	43.2	8.3			35	31.4 A	9.4		49	11	2.4	9.4			55	27.7

501—560					561—620					621—680					681—740					741—800				
	14ᵘ—16ᵘ		+78°			16ᵘ—18ᵘ		+78°			18ᵘ—19ᵘ		+78°			19ᵘ—21ᵘ		+78°			21ᵘ—22ᵘ		+78°	
m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′		m	u ′ ″		′	
6.5	14 56	35	45.2	A	9.4	16 38	30	57.3		7.4	18 2	52	41.4	A	9.4	19 33	50	21.2		9.5	21 10	17	15.8	
8.8	57	15	40.2		6.8	42	3	2.2	A	9.3	58		43.0	B	9.0	34	28	10.9		7.5	12	14	3.6	A
9.2	15 3	25	42.0		9.1	43	13	5.7		8.6	7	19	13.5		9.0	36	54	6.5	A	9.5	14	27	50.3	
9.5	7	59	48.4		8.5		45	13.5	F	9.5	8	40	27.8		9.1	37	23	12.8		6.8		49	22.6	A
9.5	9	55	46.9		8.0	46	5	6.7	F	9.2		45	57.9	L	9.5	42	10	26.6		9.5	16	3	23.5	
8.4	10	22	57.3	A	9.2		35	27.3		9.5	9	8	19.9		9.4	43	37	29.7		9.5	17	36	33.9	
8.3	17	4	54.3	A	9.4	47	7	25.8		9.0	12	34	19.4		9.5	44	49	32.5		9.5	19	8	0.1	
9.5		39	13.6		8.4	52	48	8.1	B	9.0	17	20	6.7	A	9.5	45	32	20.2		9.5	21	15	47.7	
9.1	21	43	2.3		8.5	57	30	9.6	A	9.5	19	3	53.7	A	8.5		42	51.7	L	9.0	22	4	7.4	A
7.2	23	8	54.6	A	9.5	59	24	21.5		9.5	20	9	33.6		9.0	47	5	32.5		9.5		43	46.7	
9.5		52	41.6	B	9.2	17 1	11	15.2	B	9.3	24	33	26.9		9.5	48	38	39.3		9.4	25	30	39.7	
9.0	24	5	47.9	A	9.5		12	3.3		7.7		47	59.3	A	9.0	50	7	35.4	B	8.8	28	8	11.3	A
9.0		42	25.3	A	7.0	3	10	9.2	A	9.2	25	41	7.7	A	9.5	54	39	55 5	B	9.4	29	26	41.3	
9.5		54	2.3		9.5		33	40.0		8.5		45	52.4	A	7.5	57	34	14.8	L	9.5		58	44.2	
9.2	25	15	15.9	A	9.5		39	57.4		8.9	27	9	18.1	B	9.5	59	26	38.9		9.5	31	20	8.4	
9.1	31	49	40.6		9.5	4	20	32.7		9.2		58	18.7	B	9.4	20 3	38	7.8		9.5		22	20.6	
9.1	34	15	13.4		8.8	5	36	42.0		8.5	30	3	58.6	B	9.4	4	14	4.5		8.7	33	30	15.7	A
8.3		43	48.9	A	9.5	7	11	37.7		9.4	32	43	54.0		9.0	6	44	17.7		8.8	34	50	16.7	A
9.0	36	33	47.8	A	9.0		12	51.2		9.5	33	3	34.2		9.5		49	8.4		8.8	38	26	24.6	
9.1	38	36	40.2		7.0		41	18.9	F	9.1	37	31	12.5	B	9.0	10	46	29.0		9.5	42	27	48.1	
8.7		36	25.8	A	9.3	11	4	39.6		9.3		52	27.7		9.5	12	2	0.5		8.9	47	8	23.2	B
9.5		53	12.7		9.3		14	1.9		9.3	38	17	12.7		9.1	14	26	59.3		7.8		30	20.6	B
9.5	41	34	54.9		9.3	13	23	45.0		9.4	39	44	14.6		8.9		58	58.0	B	9.4		31	49.6	
9.2	44	36	33.7		9.4	15	24	11.7		9.5	40	20	30.7		9.5	15	34	11.5		9.2		46	56.3	A
9.3	47	44	49.5		9.2		29	26.8		9.1	42	39	16.7	B	9.5	16	8	53.1		9.5	48	45	45.7	
8.4	49	13	26.4	B	9.0	16	53	45.0		9.3		53	10.0		9.5	17	25	7.8		9.5		58	47.7	
4.7		17	13.2	A	8.4	17	10	59.5		9.4	43	36	54.7		9.5	18	3	28.3		9.5	51	48	26.0	
9.4	50	27	1.9		9.4		26	21.3		9.5	45	43	45.5		9.5	19	4	56.3		6.5	53	51	51.7	A
9.5	51	35	42.6		9.4	19	8	41.4		9.5	47	19	31.7		9.5		17	5.8		9.5	54	42	40.7	
8.6	53	10	11.2	A	9.1		9	47.8		9.0	48	2	53.0		9.5	22	56	15.6		9.5	55	0	7.5	
9.0	56	26	17.1	A	9.5	20	52	28.0		9.4	49	35	54.9		9.5	24	34	8.2		8.4		54	9.0	A
8.3	57	23	7.3	A	9.5	26	12	46.0	B	9.5	50	20	30.2		9.5	26	45	45.5		9.5	57	50	33.9	
9.5		58	17.1		9.4	29	7	40.4		9.5	51	3	48.5		9.5	29	44	13.1		9.5	59	7	43.2	
9.4	58	18	5.8		9.5	30	0	18.0		8.8	52	20	11.6		8.2	30	19	36.7	A	9.5		15	56.6	
9.3	59	4	19.6		9.0		28	31.0		9.4	53	51	29.3	B	9.5	38	28	14.5		8.5		16	16.6	B
9.1		54	39.8	A	9.0		47	2.0		9.4	56	19	42.3		6.9	41	39	54.5	L	9.5	22 4	5	3.1	
8.8	16 0	44	38.0	A	9.4	32	32	20.8		9.5		55	22.9		9.5		48	29.7		9.5	5	37	47.8	
9.5	6	45	31.2		9.1	37	2	13.9		8.7	57	7	40.3	B	8.5	42	34	46.2	B	9.5	7	23	31.5	
9.3	7	5	51.5		9.5		23	57.6		9.5		15	9.2		9.5		45	9.1		9.0	8	44	37.5	
9.5		25	0.7		8.9		33	29.6		7.5	58	13	39.1	A	8.5	43	28	32.7	A	8.8	9	23	9.0	A
9.4	8	52	21.1	B	9.0		53	26.2		7.5		48	46.5	A	9.0	44	25	19.0		9.5		30	36.5	
9.2	9	13	41.9		9.1	42	0	19.8		9.4	19 0	57	39.1		9.5	46	15	24.9		8.4	11	41	55.6	A
9.5		28	56.2		9.3		15	5.0		9.5	3	53	17.5		9.5	47	18	44.0		9.5	12	56	36.6	
9.5		39	2.2		9.5	44	45	27.6		9.2	6	5	22.5		8.0		53	17.5	L	9.2	17	20	16.3	
9.5	11	42	38.7		9.5	46	42	28.0		8.9		58	59.2		9.0	48	42	24.3		8.0	18	27	57.4	A
9.2	12	33	9.2		9.4	48	34	43.8		9.3	7	2	6.9		9.5	49	55	56.4		9.5		53	14.4	
9.4		45	24.5	B	8.9		38	17.8		9.4		45	41.7		7.8	50	1	42.0	A	9.0	20	2	26.2	B
9.4	13	18	22.7		9.5	49	55	9.0		9.5	9	21	15.8		9.2		43	35.7	A	9.3		23	26.5	B
9.0	15	47	28.3		9.5	51	24	23.2		9.2	10	14	31.9		9.5	54	24	59.0		9.5		49	39.9	
9.4	17	30	11.6		9.0	52	52	37.9	A	9.3	11	39	34.4		9.5	56	27	18.5		9.5	21	33	48.3	
9.5	18	57	6.1		9.1	54	2	56.6		8.8	12	5	31.4	A	8.6	57	52	54.9	L	8.6		41	8.0	
9.3	23	5	33.2		8.0	55	40	25.3	A	9.5	13	19	35.9		9.5	21 0	28	20.5		9.1	22	4	3.6	
9.5		55	11.3		9.5	57	40	13.5		9.5	17	6	2.0		9.2		44	7.9		9.5		58	14.0	
9.4	24	19	45.2	B	9.5		48	28.2		9.5		54	37.8		9.5	1	31	19.6		9.5	23	47	44.0	
9.5	30	9	50.4		9.5	58	20	5.2		9.3	25	27	39.1	B	9.3	3	19	55.2		9.5	24	50	38.0	
9.2	33	4	25.8	B	6.5		21	20.4	A	8.1	26	38	51.3	L	8.2		45	43.9	A	6.0	25	34	1.2	G
9.0		21	47.4	A	9.5	59	1	23.8		9.5	27	0	25.1		9.0	5	11	44.0	A	9.3		45	27.7	
9.5		51	25.6		9.5	18 0	11	56.8		9.3	29	0	10.3		8.5		32	42.5	B	9.5	27	35	40.0	
9.5	36	24	56.7		9.5	1	16	50.4		9.5	31	45	6.0		9.0		40	58.1	A	9.4		49	56.7	
9.2	37	41	15.3	B	9.1	2	16	55.0	A	9.1	33	15	8.4		9.5	8	26	2.0		9.4	28	25	45.5	

801—811						812—822						823—833						834—844						845—855					
	22ᵘ			+78°			22ᵘ—23ᵘ			+78°			23ᵘ			+78°			23ᵘ			+78°			23ᵘ			+78°	
m	ᵘ	′	″	′		m	ᵘ	′	″	′		m	ᵘ	′	″	′		m	ᵘ	′	″	′		m	ᵘ	′	″	′	
5.7	22	28	33	4.2	G	9.5	22	46	47	42.0		8.5	23	8	9	50.9	A	8.0	23	22	22	44.6	B	9.5	23	40	7	47.1	
9.5		29	17	54.3		7.7		50	53	8.2	L	8.8			18	15.0	A	7.5		32	59.7		A	9.2		42	18	21.9	A
9.2		33	18	27.7		8.5		51	0	17.9		7.5		11	26	26.8	A	9.5		42		25.7		9.5			47	4.3	
9.5		38	55	19.4		9.1			18	57.7		7.7		14	50	12.0	A	9.5		25	31	46.5		9.2		44	9	20.0	A
9.2		39	13	8.6		9.0		52	5	22.3		9.5		15	49	57.3		9.5		27	9	26.3		9.5		45	3	10.2	
8.9			16	5.2		9.5		54	2	26.3		9.5			59	5.7		9.5		28	44	23.3		9.1			19	16.1	A
9.5		40	11	49.8		9.3		55	43	58.1		9.1		16	9	1.2	A	9.4		29	12	16.0		7.8		50	6	57.0	B
9.0		43	10	8.1		9.5		58	1	4.2		9.4			30	10.6	A	9.0			55	52.2	A	9.4		51	46	10.1	
9.5		45	5	15.5		9.5	23	0	12	16.0		8.8		18	27	46.9		9.5		31	18	27.2		9.5		53	25	52.2	
9.4			51	9.6		9.4		5	51	15.5		9.3			58	28.7		8.8		32	49	45.0		9.2		56	8	29.7	A
9.5		46	19	47.1		9.3		8	6	54.9	B	9.5		21	48	36.1		9.2		38	23	30.7	A	9.1		58	8	8.0	A

Zone +79°

1—20						21—40						41—60						61—80						81—100					
	0ᵘ			+79°			0ᵘ—1ᵘ			+79°			1ᵘ			+79°			1ᵘ—2ᵘ			+79°			2ᵘ—3ᵘ			+79°	
m	ᵘ	′	″	′		m	ᵘ	′	″	′		m	ᵘ	′	″	′		m	ᵘ	′	″	′		m	ᵘ	′	″	′	
9.3	0	1	41	36.8		9.0	0	44	5	51.3		9.1	1	14	2	41.7		7.5	1	50	42	57.5	A	9.4	2	28	37	38.3	
9.4			59	37.9		9.3		46	36	19.4		9.2			5	38.9		9.0		52	33	43.4		9.5			58	45.3	
9.3		6	14	40.6		8.6			54	58.8	B	9.3			43	28.1		6.7		56	36	0.1	A	9.3		29	13	43.1	
8.9		9	27	25.3	A	6.5		48	38	46.4	L	9.4			48	57.5		9.5			48	40.0		9.2		32	3	33.0	
9.2		11	5	40.5	A	9.5		49	31	58.3		9.4		19	43	17.1		9.5		58	59	38.8		9.2		33	32	53.5	
9.0		12	9	53.3	A	8.8		54	23	19.5	A	8.9		24	2	3.7		9.5		59	27	17.5		7.0		36	4	29.0	A
9.3		15	6	7.6	A	9.4		55	0	19.5	A	9.5			58	23.9		9.5	2	6	29	46.7		8.8		38	58	48.6	A
9.2			34	19.0	A	9.5			22	1.8		9.5		27	39	16.6		7.7		7	11	6.5	A	8.4		39	43	39.2	A
9.5			42	50.9		6.4		57	4	13.5	A	9.5		28	2	7.5		8.3		10	0	56.8		8.9		43	17	11.3	
7.0		17	55	14.5	A	9.3			17	18.5	A	9.0		30	24	47.5	A	9.3			32	3.7		8.8		46	56	50.5	B
8.9		18	9	34.0	B	9.3		58	18	33.7	A	8.0		31	10	31.3	A	9.2		12	57	45.7		8.3		49	31	43.8	A
9.5		22	23	45.0		9.4		59	31	33.7		9.3			13	52.6	A	9.5		13	45	22.1		9.5		52	20	8.8	
9.5		23	27	34.7		9.5	1	0	46	20.4		9.4		34	14	58.0		9.5		14	39	42.2		9.4		53	15	54.2	
8.5		27	51	21.4	A	9.3		1	36	0.4		9.3		36	8	38.3		9.4		15	30	32.0		7.3		55	22	35.6	A
8.8		31	24	21.4	A	9.3		3	21	26.6		8.6			42	29.5	A	7.5		18	24	4.8	A	8.9			45	32.2	A
8.9			58	19.0	A	6.5			54	8.0	G	9.5		43	14	46.8		8.4		21	12	28.0	A	8.1		58	27	47.7	G
9.5		32	30	14.0		9.4		7	27	21.7		8.8		45	44	34.5		8.9			56	33.9		9.3	3	0	25	52.2	
9.4		38	18	1.0		9.3		8	5	21.7		9.2		47	34	7.5		9.0		25	45	30.2		9.1		1	49	54.6	G
7.7		41	34	2.2	A	8.0		9	14	21.6	G	9.5		48	6	9.7		9.4		27	15	52.7		9.5		2	12	45.9	
9.4		43	22	11.2	B	9.0		11	7	33.4	A	9.5		49	46	17.3	A	9.4		28	33	37.3		9.2		5	20	33.2	

101—160					161—220					221—280					281—340					341—400				
	3ᵘ—4ᵘ			+79°		4ᵘ—6ᵘ			+79°		6ᵘ—8ᵘ			+79°		8ᵘ—10ᵘ			+79°		10ᵘ—12ᵘ			+79°
m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′	m	ᵘ	′	″	′
9.3	3	8	12	47.8	9.5	4	44	20	42.8	9.5	6	38	2	37.1	9.0	8	24	9	7.5	9.4	10	33	41	0.3
9.5			21	55.7	9.3			47	7.4	8.0			26	20.0 A	9.4		25	5	54.8	9.5		34	1	26.0
9.0		13	21	12.0	8.8		46	55	16.8	9.0		40	8	20.9 A	8.8		27	39	40.4 A	9.5		37	39	49.0
9.0		16	4	46.9	9.5		48	27	7.8	9.5		43	15	2.7	9.4		29	55	22.7 B	9.4		38	8	12.1
9.3			38	26.2	8.9		51	32	32.9	9.2		44	11	37.6	9.5		30	23	23.4	9.2		43	19	49.5
8.3		18	22	59.0 B	9.5		54	23	17.2	8.7			24	27.3 A	8.3			25	29.0 B	9.2		45	19	38.7 A
8.3		20	28	3.0 F	9.0		58	7	6.1 A	9.5			45	20.9	9.5			36	16.4	9.5		48	35	23.8 A
8.9		26	23	57.1	9.0			44	3.6 B	9.1		50	56	31.2	9.5		32	39	20.8	7.3		49	26	39.4 A
9.2			34	23.7	5.2			45	3.2 A	9.5		52	20	42.0	9.4		33	13	30.1 A	9.5			58	25.7 A
7.8		27	5	51.2 F	9.1	5	0	5	35.1	8.8	7	0	1	22.9	9.4		36	53	24.2 A	9.5		53	51	9.7
8.9			44	6.1 B	8.5		4	49	2.8 A	9.2		1	26	24.3	9.4		38	44	24.2	9.5		54	14	21.7
9.3		28	1	11.3	9.5		8	46	43.5	9.5		2	8	4.7	9.5		40	51	45.9	8.0	11	1	20	40.9 A
9.1		30	50	28.9 B	7.7			58	43.3 A	8.5			31	22.3 s	9.0		43	46	38.0	9.5		2	8	5.7
9.0		31	21	41.4	8.9		11	34	2.1 B	8.7		3	21	34.5 B	7.0		45	22	54.6 A	9.5			28	21.6 B
9.5		32	27	35.0	9.0			38	47.6	9.5			27	56.2	9.4		47	17	34.5	9.2		4	38	5.1 A
9.0		35	32	2.7	9.5		12	40	34.9	9.4			36	15.5	8.5			58	26.7 A	7.2		5	23	6.0 A
8.9		36	17	14.8 s	9.5			45	20.2	8.3		6	25	9.1 A	9.3		50	54	2.2	9.5		8	22	48.0 A
9.5			50	38.5	9.5		14	30	13.3	9.4		7	53	29.7	9.4		51	5	43.8	9.5		9	20	10.2 B
9.5		37	7	29.6	9.5		15	20	54.0	8.7		8	33	25.9 B	9.4		55	29	49.8	9.5		11	11	16.3
8.6			20	46.2 B	9.5		16	11	27.4	9.5		11	11	38.5	7.3		57	39	51.8 A	9.5		16	4	17.7
8.7			52	4.9 F	9.4		17	4	40.3	9.5		13	8	55.2	9.1		59	51	1.7 A	9.0			31	55.9 A
9.4		40	47	40.9	8.7			58	13.8 A	9.5		14	41	54.8	9.5	9	1	40	1.2	9.5		17	20	38.4
9.5		41	33	8.8	7.7		21	6	31.5 A	8.2		16	15	51.3 A	9.0		6	24	19.8 A	9.5		18	57	10.0 B
8.9		43	30	4.5 F	9.5		22	28	15.3	9.4			21	57.6	9.5			56	29.7 A	9.5		19	21	39.4
8.3			40	21.7 F	9.5			39	3.0	9.4			57	9.0 B	7.4		8	36	2.4 A	9.3		22	29	18.1 A
8.3		45	42	13.3 A	9.5		24	46	59.0	9.5		19	34	21.5 B	9.5		9	4	18.8	9.2		23	35	6.9
9.5		46	20	21.7	9.5		33	58	26.0	9.5		20	55	39.2	9.5		10	52	11.0	8.7			38	15.9 B
9.0			45	33.7 B	9.0		34	31	58.4 A	9.2		21	10	11.5 B	9.5		13	19	31.7	9.5		25	5	42.8
9.2		47	24	44.7	9.2			37	15.3	8.5		22	57	33.9 s	9.4		15	30	56.0	9.1		26	40	18.2 A
8.7		48	26	0.3 A	9.5		35	34	55.0	9.5			58	25.0	9.5		19	38	8.5	9.4		31	23	1.2 A
8.8		50	26	26.6 A	9.5		39	28	44.7	9.5		23	35	21.8	9.0		20	28	11.1 A	9.5		34	36	49.1
9.1		51	29	53.1	9.0		42	44	11.3 A	9.5		24	45	22.7	9.3		22	35	44.4 A	9.5		35	46	59.0
9.4		52	28	59.0	9.4		44	29	56.4 A	9.5			48	43.9	9.2			54	8.8 A	8.5		36	17	1.5 B
9.5		53	55	42.8	9.0		46	38	2.9	8.8		26	19	45.1	9.3		23	11	18.5 B	8.7		38	21	31.2 A
9.5		57	20	6.8	9.0		49	20	33.0	9.1		31	46	5.5 A	9.3			40	20.0 A	9.5		43	40	43.8
8.8			52	0.4 A	7.8		53	2	20.7 A	9.3			52	55.1	7.5		24	50	27.7 A	9.4			43	12.9
8.8		59	58	1.0 A	9.0		54	17	44.8 A	9.5		32	6	19.2	9.2		25	17	6.9 A	9.0		45	17	59.0 A
9.0	4	0	17	8.5	7.5		56	23	48.6 A	8.8		33	8	5.9 A	9.4		27	18	32.1 B	8.9		47	12	6.0 B
9.5			58	14.3	9.5	6	1	56	4.8	8.0			17	52.7 A	6.0		29	56	47.8 A	9.4		49	40	12.3
9.4		2	42	11.9 A	8.3		4	33	43.8 A	9.2		34	6	42.4 A	9.4		31	29	13.3 B	9.3		51	25	12.3
9.2		3	24	16.9 A	7.5		8	9	33.5 A	9.5		37	32	19.8	9.5			57	13.6 B	8.5		53	45	53.1 A
8.9		5	15	17.5 B	7.0		9	13	3.5 A	9.5			46	27.1	9.4		34	28	11.0	9.5		55	44	4.0
8.0			34	20.7 A	9.4			34	36.4 A	9.2		39	54	15.4	9.2		39	7	40.3 A	9.5		58	40	50.7
9.5		11	20	58.0	9.5			53	3.3 A	9.0		40	33	2.2	9.5		48	51	22.8	9.5		59	10	36.8
8.5		12	14	56.5 s	8.6		10	37	16.2 A	5.8		41	52	51.7 G	9.5		50	26	36.5	9.4	12	0	7	16.2
9.5		14	16	52.1	9.3		11	56	30.0	8.8		48	45	15.3	8.9		53	27	45.8	9.2		6	23	11.5 A
9.5			16	8.5	9.3		14	54	44.8	8.5		50	25	37.4 A	9.3		54	32	26.3	9.1			53	14.7 A
9.5			43	26.5	6.3		15	21	40.6 A	8.5		53	7	44.8 A	6.7	10	0	47	39.4 A	9.3		9	46	51.2 A
8.5		20	6	28.0 A	8.0			45	13.7 B	7.8		54	0	55.5 A	8.0		6	23	29.6 A	9.5		12	59	43.2
7.0		21	41	20.7 A	9.5		16	1	23.5	9.5		58	35	15.4	7.3		8	51	4.1 B	9.0		14	29	59.4 s
9.1		23	59	34.9 A	9.5			32	1.7	9.5	8	1	53	57.5	9.5		13	55	3.6	9.2		18	0	16.3 B
9.3		24	36	47.9	5.5		21	24	42.5 B	8.6		8	14	51.7 A	9.5		14	19	53.1	9.5		22	17	50.1
9.4		26	32	11.6 B	9.5		24	14	14.6	9.0			51	39.9	9.5		15	4	38.5	8.6			20	1.7 A
9.4		29	32	36.8	9.5		27	41	0.0	9.5		11	6	37.9	9.5		18	36	51.7	9.0			43	59.4 s
8.4		30	28	23.7 s	9.5		28	43	36.6	9.4		13	30	1.8 B	8.8		19	41	14.7	9.5		23	38	44.7
9.5		31	9	43.8	9.5		33	14	28.5	9.5		16	33	1.6	9.3		22	3	52.9	8.8		31	5	42.8
9.3		34	42	53.3 B	9.2			28	5.0	8.3		19	7	34.5 A	9.2			50	45.8	9.5		34	24	59.8
9.4		39	31	20.7 A	9.1		34	56	7.8 A	9.3			42	11.9	9.5		24	53	3.6 B	9.4			28	45.2
8.8		40	8	41.3 A	9.3		35	11	47.9	9.2		20	27	44.8	9.5		26	11	3.4	9.1		35	57	2.5
9.1			56	22.5 A	9.0		36	45	1.0 A	9.0		22	26	50.1 A	9.0		29	56	57.0 s	8.7		36	19	49.1 s

401—460					461—520					521—580					581—640					641—700				
	12h—15h			+79°		15h—16h			+79°		16h—18h			+79°		18h—19h			+79°		19h—21h			+79°	
m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	m	h	′	″	′	
9.5	12	36	57	7.1	9.4	15	13	38	2.5	9.0	16	59	22	13.2	A	9.0	18	27	28	57.4	B	8.5	19	48	12	40.1	L
9.5		37	45	38.7	9.5		16	57	46.0	9.3	17	0	49	19.5		9.5		29	6	4.6	B	9.4			37	21.5	
9.0		38	49	2.3	A	9.2		18	14	12.3	A	9.3		1	16	7.9		9.5		48	5.6		9.4		49	11	15.9	B
9.3		41	0	39.3		9.5		20	8	2.8	B	9.1			27	42.2		8.2		48	56.3	B	9.5		50	34	52.9	
9.4		47	38	3.6		9.3		23	51	25.3		9.3		2	15	7.1	B	8.5		31	55	3.6	A	7.5		51	42	10.2	L
9.5		49	37	17.0		9.0		28	25	50.5		9.5			58	7.9		9.0		33	0	3.2	A	9.4		52	48	58.8	
7.0		51	41	16.2	A	9.4		35	18	6.0	B	8.8		4	6	8.6	A	7.0			32	6.8	A	9.1		53	26	11.7	
9.5		54	29	35.8	A	9.4			20	14.3		9.5		5	53	32.6		9.5		34	13	59.0		7.0		54	4	4.9	L
9.0		56	20	13.3	B	9.5			34	9.8		9.3		11	49	28.5		9.5			31	3.6		9.0		58	37	13.1	L
9.0		57	30	40.9	A	8.0		40	4	40.2	B	9.4		12	31	59.8		9.5		35	54	18.9		8.8		59	13	19.5	L
9.4			36	14.4	B	9.5		44	9	28.3		9.5		14	27	3.8		7.8		37	43	42.2	A	9.5	20	2	12	17.2	
9.5		59	17	27.6		9.5		50	22	38.1		8.8		16	26	35.8		9.5		40	10	28.9	B	8.3		3	26	2.5	S
9.0	13	0	8	33.1	A	9.3		53	26	11.0		9.3		18	1	49.0		9.5			52	25.9		9.0			55	32.8	
9.5		3	41	50.1		9.4		54	23	46.0		9.3			22	8.8		9.4			52	38.5		9.5		4	18	39.2	
9.5		4	6	19.7		9.5	16	0	26	12.6	B	9.0		20	28	37.6		9.5			55	22.5		8.3			47	6.2	L
9.5		9	20	21.2		9.5		3	11	37.2		8.0		24	43	41.0	A	9.3		41	58	51.8		9.5		6	48	16.1	
9.5		10	31	8.4		9.5			30	24.4		9.3		26	40	42.8	B	9.5		42	46	7.2		7.8		7	20	8.7	L
7.5		13	0	28.1	F	9.0		6	9	26.8		8.5		27	29	2.6	A	9.5		50	4	44.8		9.5		8	0	54.9	
8.5		18	14	4.7	B	9.4		8	17	1.0		9.4		28	7	42.3	B	9.5			22	38.6	B	9.2		9	46	1.5	
9.5		20	16	48.6		9.1		11	23	20.6	B	7.3			48	26.7	A	9.5		51	14	43.4	B	6.5			49	15.5	B
9.0		21	4	18.7		8.9			43	3.4	B	9.5		29	0	44.4		9.3		53	24	36.6	B	9.4		12	18	54.3	
6.0		25	50	23.2	A	9.4			56	8.5		8.5			3	30.2	A	9.3		54	18	33.6		9.2		13	14	26.4	
9.4		26	29	27.1	A	8.9		12	19	14.8	B	9.0		30	30	22.9	A	9.4		55	27	4.6		9.2		14	26	54.7	
9.3			46	42.8		9.0		13	42	37.0		9.2		31	43	6.8	A	6.5			50	45.9	A	9.5		15	51	17.7	
9.5		32	23	10.4		9.3		15	43	27.7		9.2		34	52	11.0	A	8.0		58	1	58.3	A	9.5		17	49	19.2	
9.5		34	24	17.3		9.3		17	37	54.8		8.8		35	6	21.3	A	9.4	19	0	7	45.6		9.5		18	32	9.8	
9.5		39	36	22.2		9.5		19	28	22.8		9.5		39	25	2.1		9.1			56	37.2		9.3			46	5.0	
9.0		42	9	36.9	A	9.5		20	55	51.0	B	8.5			25	20.5		9.5		1	49	9.6		7.0		20	14	11.0	A
9.3		45	10	48.7	A	8.8			56	43.0		9.5			51	57.2		9.5		3	56	21.9		9.0		21	11	4.3	
9.5		47	34	17.2		9.4		21	33	45.0		9.0		40	12	41.5		8.8		7	35	10.6		8.9		22	44	34.6	A
6.6		50	33	42.8	A	9.5		24	27	8.0		8.8		41	10	30.7		9.5		8	30	51.4		9.5		25	11	46.7	
9.5		52	11	9.3		9.4		25	32	0.3		9.4		42	40	39.7		9.5		9	52	58.3		9.4		27	21	22.7	B
7.7		55	26	5.6	A	8.8			56	31.1		9.4		43	41	12.4	B	9.5		11	38	43.0		9.0		31	0	44.3	B
7.7			30	40.7	A	9.2		27	6	14.4		9.5		44	21	40.6	B	7.5		14	13	24.4	A	9.5			2	24.6	
8.1		56	28	23.9	A	8.7		28	18	11.1	G	9.5			49	39.4		9.0			22	30.8		7.3		32	38	43.3	A
9.5	14	4	25	54.0		8.7			27	31.8	B	7.3		47	7	16.1	L	9.1			33	52.9		9.5		38	46	5.0	
9.5			30	36.4		8.9		33	15	49.8		8.0		48	50	11.9	L	9.4		15	12	14.6		9.5		39	55	18.2	
9.5		5	26	20.6		5.5			56	16.0	A	9.5		49	30	16.3		9.5			30	50.9		9.5		41	59	54.6	
9.5		12	23	47.7		9.0			59	35.6	A	9.3		52	20	19.8		8.7		16	8	59.3	B	9.3		42	25	0.3	
9.3			46	11.7		9.5		34	52	2.7		9.5		53	27	59.0		9.5		19	9	32.3		9.5		44	27	20.6	
9.5		17	44	35.4		9.5		38	37	10.3		9.5			39	28.2		9.5		20	15	21.4	B	9.5			54	28.1	
9.1			53	24.0		9.5		39	31	46.9		9.5		56	40	59.0		9.5		21	34	17.2		9.5		45	0	40.8	
7.8		19	4	59.4	A	9.5		40	17	3.0		9.2		57	0	29.6	A	8.8		22	10	37.3	A	9.4		46	30	58.4	A
9.5		20	8	39.8		9.0		41	48	10.7	B	7.5		58	38	21.2	A	9.4		23	35	3.2		9.5		49	51	46.8	
9.5		23	0	28.0		9.4		42	5	44.1	B	9.2		59	17	6.5	A	9.0		25	10	14.4		9.5		51	30	34.5	
9.0		24	41	59.0	s	9.3			42	18.6	B	8.8	18	6	20	48.7		9.5		26	16	42.6		9.3		53	39	43.8	
6.8		29	8	9.3	A	9.1		44	2	25.5	B	9.0			45	19.8		9.3		28	32	35.8		8.7		58	45	57.5	L
9.5		35	31	21.5		7.8			38	29.7	F	8.8		8	21	1.4	L	6.3		30	26	17.7	G	9.3		59	16	15.7	
9.5		37	34	42.1		9.5		45	5	17.9		8.4		10	6	47.7	L	8.0		33	10	29.4	A	9.5	21	0	14	58.1	
8.7		39	17	46.6	A	8.5		46	4	27.6	s	6.5			55	59.0	S	9.3			13	36.3		8.6		2	41	57.6	
9.3		41	7	39.3	A	6.3			15	10.8	F	6.5		11	2	59.9	S	9.0		35	51	41.5	A	9.3		3	20	41.5	
9.3			57	39.5	A	9.5			38	25.3		8.5			37	5.5	L	9.0		36	11	51.4	A	9.3			34	49.2	A
8.8		43	33	41.2	A	9.4			44	28.3	B	9.4			44	23.8		9.3			12	38.3		8.8		4	1	34.9	A
9.5		49	56	7.4		9.2		52	46	32.4		8.5		12	5	56.5	B	9.1		38	2	57.4	A	9.0		5	22	54.7	A
9.5		50	56	39.8		8.0		53	4	45.1	s	9.5			13	0.0	B	9.5			37	14.2		9.5			35	17.4	
9.5		54	42	37.9		8.8		55	57	34.3		8.2		14	7	4.9	A	9.3		39	26	57.0		9.2			45	26.6	
9.1		57	18	20.2	A	6.8		57	7	43.6	A	9.5		19	28	39.9		9.5		40	42	18.6		9.3		6	38	5.7	
8.6	15	8	57	45.0	s	8.8			27	54.9		9.1		21	55	32.6		7.5		42	49	49.0	L	9.5		15	2	18.1	
8.8		10	9	36.7	s	9.5		58	0	11.2		8.3		23	3	19.5	A	9.5		43	40	4.9		8.5		16	48	44.2	B
9.2		11	35	8.5		9.4			26	6.0	A	9.1		27	22	4.6	B	8.0		46	37	39.2	L	9.4		22	40	24.9	

701—721						722—742						743—763						764—783						784—803					
	21u			+79°			21u—22u			+79°			22u			+79°			23u			+79°			23u			+79°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
7.8	21	22	44	43.6	S	9.5	21	57	30	57.8		9.0	22	31	4	26.4	A	9.2	23	0	30	57.9		9.3	23	28	32	13.7	A
9.5		23	49	8.7		9.5	22	0	22	55.0		9.5		58		53.4		9.2		1	22	0.4		8.8		30	2	47.2	A
9.5		24	52	56.3		9.5		2	17	4.0		9.5		34	7	45.0		9.4		2	33	36.4	A	8.2			32	38.8	A
9.5		25	42	8.7		9.5		3	18	8.3		9.5		34		11.1		9.0		4	0	26.0	A	9.0		31	50	7.6	A
9.5		26	53	36.8		9.5			56	53.0		8.8		36	27	9.6	A	7.7			21	51.4	A	9.1		32	44	10.8	A
9.5			56	55.8		9.4		10	20	57.9		9.3		39	21	22.3	B	7.5			34	46.8	A	9.5		33	45	26.5	
6.0		29	1	53.8	A	8.3		12	25	19.1	A	8.8			22	26.6	A	9.5		6	25	13.7		8.2		34	1	1.1	B
9.0			30	9.2		9.5		14	11	38.3		7.0		42	46	40.1	A	8.8		7	54	42.2		9.5		36	43	18.2	
9.1		30	38	41.5		9.5			46	17.2		9.1			56	23.4	A	8.7		9	38	6.7	A	9.3			52	44.2	
9.0		31	14	40.0		9.5		15	7	57.9		9.4		44	23	1.3		9.5		10	6	0.1		8.3		41	46	45.2	A
9.2		35	53	11.6		9.2		16	2	12.2	A	9.5			52	28.3		9.5			6	55.5		9.5		42	20	33.4	
9.5		36	2	18.1		8.5		17	38	3.6	A	9.5		46	4	48.0		9.5			39	25.0		9.5		44	35	30.4	
9.3		39	23	12.6		8.3		18	25	9.8	A	9.5		47	4	25.9		8.5		13	4	20.7	A	8.3		46	8	2.4	A
9.5		41	40	19.0		8.9			32	52.8	B	7.2			54	36.7	G	7.8			55	6.4	A	9.5		47	59	25.0	
9.5		42	39	13.1		9.4		24	1	32.2	B	9.3		50	37	35.8		9.5		16	18	0.0		9.3		54	58	53.1	
9.5		49	50	18.5		9.5			22	34.2		7.8		51	44	27.7	G	9.5		19	59	30.9		7.5		55	25	29.5	A
8.0		50	53	58.7	A	9.4		25	55	5.3		7.5		56	37	34.4	A	9.5		20	36	50.0		9.3			52	40.7	B
9.5		51	23	51.9		7.5		26	9	57.7	G	9.5		57	33	12.7		8.8		21	44	22.5	F	9.1		56	4	55.8	A
9.5		53	23	32.8		9.5			24	29.2		7.2		58	45	59.9	A	9.0		24	42	7.6		9.3		57	4	54.7	
8.2			55	16.1	B	9.4		27	19	2.7	B	9.0		59	17	27.5	A	9.5		27	3	17.2		9.2		59	25	56.0	
6.4		56	27	37.1	B	8.8		29	0	18.5		9.2			39	29.9	A												

Polar-Zone +80° bis +90°

1—20						21—40						41—60						61—80						81—100					
	0u			+80°			0u—1u			+80°			1u			+80°			1u—2u			+80°			2u			+80°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.4	0	2	20	25.3		8.9	0	39	5	48.9		9.5	1	11	56	45.8		8.6	1	46	54	17.2		9.4	2	19	36	46.4	
9.5		7	13	53.0		9.2		40	28	53.3		9.4		13	54	34.7		9.3		48	43	1.0		9.3		21	43	47.5	
8.8		8	15	50.8	F	9.2		41	14	57.8	C	8.6		14	40	17.2	A	8.9			58	55.5	C	9.4		23	42	5.3	
9.0		10	31	38.7		9.1		43	31	30.2		9.5		15	6	26.2		6.1		51	50	35.8	G	9.5		25	1	21.0	
9.2		11	5	13.3		9.5		48	10	57.8	C	9.4		16	54	7.2		6.7		52	34	45.7	G	9.0			29	14.1	
9.1			6	23.7		8.5		49	43	12.9		9.5		18	31	19.2		9.2			44	43.5		5.9		27	10	49.8	G
9.2		13	21	19.2		9.5			53	56.3	C	9.4		19	42	36.7		9.5		58	39	29.3		9.0		28	44	48.8	
9.0		14	22	22.8		9.5		50	34	20.4		9.0		20	16	33.8	A	9.5	2	1	44	10.2		9.2		36	1	36.2	
9.2		15	54	5.6		9.5		56	26	42.6		9.5		21	52	52.4		9.5			55	56.7		8.0		37	51	27.9	F
7.9		21	11	34.1	F	9.5		59	30	9.1		7.4		25	1	40.6	F	7.7		3	19	2.8	A	8.3		38	55	4.3	A
9.4			34	36.0		8.7			53	11.4		9.1		26	5	57.4	C	9.5		4	56	26.0		9.1			57	12.3	
9.4		22	3	37.7		9.3	1	2	3	42.6	B	9.1		27	56	26.8		8.7		5	24	12.8	A	9.0		39	55	41.2	
9.5		23	27	58.8	C	9.4			51	29.5		9.2		28	14	18.0		9.3		10	47	37.9		9.4		40	18	20.8	
9.5		25	43	50.8		8.0		4	23	47.5	B	9.5		32	50	35.0		9.4		11	2	53.5	C	9.5		41	24	50.3	
9.5		27	5	16.4		7.3		5	38	5.8	F	7.5		34	6	9.8	A	9.5		12	24	25.0		9.5		43	22	25.6	
8.9		31	48	59.7	A	6.7		6	9	7.9	F	9.5			25	3.9		9.4		13	7	43.3		8.8		44	44	26.7	B
8.8		34	14	6.0	B	9.1			15	57.4	C	7.5			55	39.2	F	9.4		15	29	51.0		5.5		49	34	54.2	G
9.5		35	30	30.6		8.4		10	29	36.0	B	6.8		39	42	10.6	A	9.5		16	18	47.4		9.5		50	51	46.9	
8.4		36	9	20.4	F	9.5			50	14.2		9.5		40	19	14.3		9.5		17	6	10.2		9.5		51	12	28.8	
9.1		38	13	33.4		9.2			53	52.7		9.3		42	45	43.5		8.4			11	58.5	G	8.8		53	9	47.3	

+80°

101—160						161—220						221—280						281—340						341—400					
	2u—4u			+80°			4u—6u			+80°			6u—8u			+80°			8u—10u			+80°			10u—12u			+80°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.4	2	58	45	57.0	C	9.5	4	47	2	44.1		9.4	6	33	0	54.7		9.5	8	46	4	53.8		9.5	10	43	9	34.1	
9.4			56	2.8		9.5		48	38	14.1		9.3			28	52.1		9.1		49	12	37.5		9.5			56	34.6	
8.6		59	17	10.3	B	9.1		52	5	33.4		9.4			34	5.6		8.9		50	47	24.6		9.1		44	32	17.0	
9.5			50	15.2		9.5		59	20	38.8		9.5		36	9	0.2		9.2		57	24	24.0	B	8.6		45	14	33.7	s
9.3	3	3	7	2.0		9.1	5	1	30	31.9		9.2		38	29	10.1		9.5			48	24.0		9.3			16	52.9	C
8.9		4	43	21.1	B	9.5		2	27	19.4		9.1		42	13	17.3		9.4		58	28	45.0		8.8		46	26	57.1	B
9.5		5	29	5.3		9.2			41	9.3		8.6		44	50	44.6	s	7.8	9	3	43	43.7	s	7.8			32	26.8	F
9.4		10	11	14.3		8.4		4	30	54.8	F	9.5		46	29	20.3		9.4		5	27	26.1		9.5		55	50	47.2	
9.0		11	58	11.9		9.5		5	22	0.9		9.5		51	27	47.0		8.5		14	1	58.1	C	9.5	11	5	5	49.2	
9.3		13	45	55.9	C	9.0			38	14.9		7.4		57	25	52.4	F	9.0		18	25	58.1	C	8.0			19	19.6	s
9.5		16	18	30.1		9.5		9	52	16.1		9.5		58	51	13.4	B	9.1		20	23	12.6		9.5		7	17	11.8	
9.2			57	31.6		9.5		10	10	48.8		9.5	7	12	36	46.3		9.2		21	20	46.7		9.4		13	25	14.3	s
9.3		20	21	24.2		9.5			20	21.3		8.0		16	55	51.5	F	9.5		22	21	14.3		9.4		14	45	49.3	
9.5		22	3	43.9		9.5		12	10	59.9	C	9.5		22	27	36.3		9.5			56	53.6		9.5		16	23	7.1	
9.4		24	25	25.1		9.0		13	19	47.2		9.5		23	25	58.3	C	8.6		24	12	45.7	B	9.5			40	25.2	
9.3		27	38	59.9	C	9.5		16	40	21.3		9.5		25	32	15.7		9.5		26	19	47.7		8.4		17	15	33.5	s
9.5		28	31	6.5		8.2		19	57	18.1	B	8.7		28	54	51.8	G	9.5		27	16	20.7		9.5		22	21	16.1	
9.5			52	13.8		9.4		23	44	9.2		6.5		32	4	37.0	B	9.5			19	24.7		8.3			41	43.5	F
9.5		29	18	48.3		9.5		24	7	1.3		9.5		34	51	53.8		9.4			57	46.7		9.1		25	44	8.3	
9.5		38	1	30.4		9.5		25	14	0.7		6.5		35	47	13.6	B	9.4		28	3	39.0		9.5		26	39	16.2	
7.8			54	47.8	F	7.9			24	32.0	B	8.7		40	54	0.5	G	9.4		34	48	43.3		9.4		29	5	51.3	
9.3		43	11	50.3		9.5		28	15	24.0		8.9		41	38	36.3		8.7		36	32	20.2	s	9.5		33	55	34.5	
8.3			19	33.3	F	8.8			38	12.2		9.4		42	33	55.1		9.5		40	36	45.7		9.0		36	34	48.5	B
9.2		44	56	28.5		9.3		29	30	9.7		9.5		45	45	26.0		9.5			43	4.4		9.4		37	20	36.5	
4.9		46	0	18.2	G	9.5			34	38.6		9.5		47	19	19.7		9.4		45	34	55.5		9.3		39	12	59.4	C
9.5		48	32	57.9		9.2		30	40	59.9	C	9.3		55	15	1.0	A	9.3		47	17	50.0		9.5		42	32	20.1	
6.8		53	49	9.3	A	9.5		38	26	38.0		9.5	8	0	40	34.2		9.4		48	1	45.8		9.5			47	23.1	
9.3		55	36	50.5		9.5		41	17	55.8	C	9.4		3	22	57.8	C	9.2		49	0	34.3	B	9.0		47	13	29.0	B
8.3		57	1	1.4	A	9.5		43	35	7.3		9.3			28	55.8	C	9.3		55	9	47.4	B	9.5		48	2	6.4	
9.4			17	2.0		8.7		44	3	0.9	A	9.5		5	27	53.2		9.1			9	34.6	B	7.5		52	10	24.1	F
9.5		59	18	10.3		9.5		45	16	4.8		9.5			33	35.4		9.3			18	51.0		9.5		55	57	18.7	
9.5	4	0	14	49.7		8.7		50	0	10.4	B	9.5		6	14	53.8		9.5			56	10	44.2	9.5		57	17	5.9	
5.7		2	3	28.4	A	9.5			19	21.7		9.5			34	55.5		9.0	10	0	10	9.9	S	9.4	12	0	57	56.5	C
7.4		4	15	34.8	G	8.7			47	36.0	s	9.2		8	42	50.3		9.5		5	23	8.4		9.2		3	59	47.7	
9.5		5	11	15.2		8.6			53	34.2	s	9.5		12	1	26.0		8.8			32	47.8	B	9.5		6	0	10.2	
9.4			57	54.7	C	9.1		51	3	20.0		9.5			13	7.8		9.5			59	20.7		9.5			13	47.7	
9.1		6	40	18.2		9.4			41	43.2		9.5			59	6.4		9.3		6	57	9.8		9.3			52	14.1	
8.7		8	44	27.7	s	8.5			55	0.1	B	8.8		13	49	0.4	A	9.5		7	42	31.2		9.4		7	29	45.2	
9.5		10	34	50.7		9.3		53	6	37.8		9.5			55	14.0		9.5		8	8	33.0		9.5		9	23	49.0	
7.4		11	26	33.2	F	9.3			12	35.7		9.3		14	11	8.2		9.3			56	34.8		8.4			47	55.7	F
9.5		12	22	18.1		9.2			43	16.9		9.5			38	9.2		9.5		9	2	47.3		8.3			51	55.9	S
8.8			27	59.8	C	7.8		54	2	23.6	A	9.5		17	56	50.3		9.5			9	25.8		9.2		12	17	29.4	
8.8		15	18	52.0	B	8.9		55	47	16.2		9.3		21	45	0.4	B	9.5		15	59	43.4		8.5		14	37	49.2	s
9.5		16	50	0.9		8.1		56	32	10.3	A	9.5		22	3	56.0	C	9.5		16	41	42.3		9.2		16	22	10.7	
9.5		19	1	5.4		9.1		57	53	40.3		9.5		24	50	23.8		9.5		19	21	9.9		9.5		17	32	58.0	
8.0			30	31.6	F	8.1	6	0	23	55.0	s	8.4		25	54	10.6	A	9.5		24	0	29.5		9.5		27	7	42.3	
7.9		20	58	13.2	s	8.3		3	32	21.1	s	8.3		27	54	59.9	s	8.7			11	37.1	B	9.5		28	39	39.3	
9.1		22	7	52.1	B	9.4		4	31	59.2	B	8.3		29	32	31.1	G	9.4		25	10	45.5		9.5		29	38	19.0	
8.1		23	50	22.5	A	9.1			47	50.0	B	9.3		30	12	53.2		9.5		26	38	12.3		6.7		32	47	1.3	s
9.4		25	57	34.4		7.2		8	33	39.2	s	9.4		33	39	51.5		9.5			59	10.0		9.2		35	41	4.3	s
9.5		28	20	28.9		9.5		9	24	44.0		9.4			52	19.7		9.4		29	37	5.1		9.2		37	43	9.7	s
9.4		30	1	42.9		9.4			36	18.7		7.3		34	2	34.0	G	8.6		30	20	0.2	s	9.5		39	23	26.8	B
9.5		31	37	50.1		9.5		10	10	31.2		9.5			21	55.6		9.5		32	3	1.8		8.3			24	23.4	B
9.2		33	25	33.4		9.4			14	36.2		9.0			31	15.3		9.5		37	33	20.5		9.2			33	22.9	
5.5			25	56.4	G	8.8		12	11	17.1		9.5		35	11	32.6		8.8		38	45	20.5	s	7.4		41	9	43.0	s
9.1		38	39	32.7		9.5		15	18	5.7		8.7		39	5	1.7	B	9.5		40	17	44.5		9.5		43	21	36.0	
9.5			59	30.1		7.3		20	52	21.9	F	9.1		41	5	5.4	B	9.2			33	33.7	S	9.5		45	42	14.8	
9.5		40	18	12.3		9.5		23	15	25.7		9.5		43	39	17.3	C	7.5		41	38	6.2	F	8.3		54	37	43.4	s
8.6			26	23.0	s	9.5		27	57	24.3		9.4			45	47.8		8.5		42	18	59.9	C	9.5			48	26.3	
9.5			52	14.1		9.5		31	5	7.1		9.4			50	19.3		9.5			26	59.1	C	9.1		55	50	20.3	

480

401—460						461—520						521—580						581—640						641—700					
	12u—14u			+80°			15u—16u			+80°			16u—18u			+80°			18u—20u			+80°			20u—21u			+80°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.5	12	59	32	27.7		9.5	15	0	7	1.9		9.4	16	41	58	41.7		9.5	18	28	53	22.1		9.5	20	7	14	50.3	
9.3	13	6	1	32.0		9.5		1	41	39.0		9.4		42	50	21.8		9.5		30	52	35.9		9.5		8	48	50.5	
8.8		8	28	47.4	s	9.5		4	27	39.0		9.5		43	37	49.7		9.5		36	36	21.3		9.4		9	20	17.5	
7.5		10	46	25.1	F	9.2		6	58	2.7	A	9.0		45	55	6.5		9.5		37	10	8.9		8.3		11	3	16.1	L
9.4			58	57.5	C	8.0		12	56	35.4	F	9.4		47	29	14.7		9.0			24	40.6	s	9.4		15	38	56.7	
9.5		14	12	48.9		8.1		15	53	44.8	F	9.5		48	14	42.7		9.5		39	21	5.5		9.5		18	23	53.8	
9.5		15	11	4.9		9.5		16	52	0.3		9.4		50	26	34.7		9.5		46	32	36.2		9.5			37	15.2	
9.5		18	21	56.6	C	8.5		22	4	47.2	s	9.5		53	22	45.8		9.5		47	41	16.3		7.8		20	18	0.4	A
8.9		19	4	12.0		9.4			9	44.3		9.5		54	40	10.7		9.4		53	7	46.9		9.4		22	4	47.5	
9.1		20	57	39.4		8.7		23	49	55.3	s	7.9		57	57	21.5	s	9.0			11	9.2	A	6.8			33	4.4	A
9.3		26	43	38.5		9.4		26	51	38.2		9.3	17	0	29	14.6		8.5			25	8.4	A	8.7			52	7.8	A
8.8		28	41	50.5	s	9.5			52	5.7	B	9.5		1	54	53.8		9.3		55	15	42.2		8.4		25	38	41.0	L
9.4		33	8	30.7		9.5		27	11	28.2		9.2		5	40	29.3		9.5		56	19	34.5		9.1		26	48	39.5	s
9.5		34	21	47.8		8.6		29	28	59.9	s	9.5		6	34	43.0		8.4			57	53.0	s	9.1		29	38	5.9	
9.5		36	6	8.8		9.5		32	12	43.6		9.0		8	35	27.4		9.3		58	39	55.3		9.5		31	29	8.3	
9.3			30	55.8		9.5			35	19.9		9.5			44	46.6		8.8		59	54	37.5		9.5		33	0	48.7	
7.5			43	5.9	A	9.5			40	22.7		9.5		10	13	43.8		9.4	19	0	20	27.8		7.5		35	49	56.2	G
9.3		37	45	29.5		7.8		34	29	16.0	s	9.4		11	15	44.4		9.5		2	20	42.9		9.5		36	25	9.3	
9.5		39	18	20.2		9.3		36	20	8.6		9.5			46	21.5		9.2			43	31.4		5.8		37	13	55.6	A
9.2		41	56	17.7		7.0		37	47	55.6	S	9.5		15	9	51.0		9.4		3	42	12.0		6.1			40	34.9	G
7.1		42	35	57.5	F	8.3		38	0	55.6	G	9.5			50	10.7		9.5		5	14	44.5		9.5			40	13.7	
7.4		50	19	37.9	F	9.2			10	7.8	B	9.1		18	15	18.5		9.0		6	16	29.8		9.0		38	36	37.7	F
9.5		54	38	1.5		9.5		44	55	4.1		8.4		27	25	18.0	B	8.2		7	42	42.2	s	9.5		39	48	39.3	
9.5			41	45.3		9.3			59	59.1	C	6.2		30	40	15.4	A	7.0		9	18	13.5	s	9.1		42	23	24.7	s
6.3		58	49	59.7	C	9.5		45	15	43.5		9.5		35	57	34.6		9.2		16	15	17.5		9.5		44	32	42.7	
9.3		59	34	17.6		9.4			42	53.7	B	9.5		36	50	10.5		7.8			53	15.0	s	9.5		46	36	57.3	
9.5	14	5	11	16.6		6.7		47	47	26.2	S	8.5		37	23	57.6	s	7.2		17	43	28.0	L	9.1		47	23	18.1	s
9.5		8	52	0.8		9.5		51	4	17.4		9.5		40	4	19.4		8.7		18	8	43.2	s	9.5		50	9	42.3	
9.1		15	35	12.6	B	8.0			33	34.3	G	8.3			17	17.9	B	7.1			54	29.6	L	9.2			32	32.8	
9.4			53	46.2	B	9.2		52	50	28.7		9.5		42	50	9.0		9.5		22	36	48.3		8.8		52	42	31.8	
9.3		18	29	52.7		9.5		58	43	42.3		9.3		43	41	37.2		9.0		23	3	18.0		9.4			45	50.8	
8.3			51	40.1	s	9.5	16	0	20	14.5		8.9		46	9	36.3		9.5		27	8	25.5		5.3		54	4	0.4	A
9.5		19	34	14.4		9.5			30	12.0		9.5			27	33.3		9.5			39	31.3		9.3		57	43	53.6	
9.5			37	15.9		9.5			40	53.1		9.0		50	40	42.1		8.1			43	12.3	s	9.3		58	34	36.5	
9.4			38	15.6	B	9.5			52	19.4		7.0		53	45	18.7	A	9.3		28	7	18.3		9.5	21	0	15	55.0	
9.1		20	12	29.8		9.5		3	58	1.1		9.4		55	52	44.0		9.4		29	47	28.3		9.5		1	22	55.3	
9.4		23	4	14.0		8.7		5	55	37.0	s	8.9		57	15	57.4	s	9.4		30	4	37.3		9.5		2	17	18.2	
9.5		25	18	32.2		9.3			58	42.5		9.5			42	47.5		8.8			45	32.2	s	9.5		6	11	59.5	C
9.2		27	30	26.3	B	9.5		8	48	27.5		9.2		59	27	17.8	A	9.5		35	7	41.3		7.0		10	2	35.6	A
9.5			35	45.7		9.5		12	13	47.8		9.1			42	55.1	B	9.4			9	32.3		9.5		11	5	14.9	
9.5		28	37	47.5		9.5		18	7	32.2		9.5	18	2	37	23.2		9.5		41	52	37.8		9.5		12	35	45.0	
9.8			57	44.5	B	9.5		19	36	8.1		9.5		3	41	39.7		9.5		42	38	40.8		7.0			55	24.9	A
9.0		32	50	15.1		9.5		20	32	53.7		9.5		4	0	33.9		9.5			48	52.7		8.9		13	5	47.3	
8.5		36	51	58.7	s	9.5		21	25	47.0		9.0			19	55.4	C	9.5		44	31	21.9		9.3			8	23.2	A
8.5		37	9	58.3	s	8.8		22	8	19.8		9.1		10	40	39.0		9.5		45	29	41.7		9.5		15	22	31.8	
9.4			22	23.9		9.5			44	54.7		9.1		12	4	10.9		9.5		46	23	53.3		9.5			54	9.0	
8.9			28	42.3	s	9.5		23	53	55.1		8.8			21	49.2	B	8.5		47	24	10.5	G	9.0		18	13	1.7	
6.3			50	17.0	F	8.8		28	40	2.5		9.4			38	43.7		9.5		48	5	51.2		6.5			14	11.5	L
9.3		38	3	29.1	B	8.7		29	58	22.7	S	9.2		14	14	53.0		9.5			21	51.7		8.4			42	48.8	s
8.9		42	12	55.7	C	9.4		32	34	1.5		9.5			45	17.8		9.4		50	37	14.5		6.3		19	13	37.1	L
7.0		43	32	23.0	A	7.8		33	36	39.5	F	8.9		15	10	37.5		8.0		51	52	7.7	G	9.5			57	55.1	C
8.5		47	38	23.5	A	9.5		37	6	35.2		9.5		20	12	7.4		9.4		54	41	57.0	C	9.2		20	31	7.6	
9.3		49	14	44.1		9.1		39	1	25.9		9.3		23	13	41.7		9.1		56	4	55.3	C	9.3		21	50	37.5	
9.2			24	40.2		9.0			26	28.1		9.5		24	22	9.9	A	9.5			20	8.2		9.5		26	20	58.8	C
9.5			53	44.3		9.2			59	32.8	B	8.0		26	6	35.2	L	9.4	20	0	4	38.2		8.9		27	25	17.5	
9.4		51	30	44.3		9.4		40	2	34.8		9.2			36	30.2		9.2		1	7	27.9		8.8		31	39	17.8	
9.5			58	59.2		9.5			23	32.8		8.6			47	31.3	L	8.7			36	48.7	L	9.5		32	46	31.1	
9.4		58	53	23.8		9.0			38	35.8		9.1		27	45	58.4	C	9.1		3	30	27.9		9.3		35	34	25.7	
8.2		59	13	6.6	B	7.0			45	5.1	F	9.5		28	6	7.4		9.2			50	45.0		9.5		37	21	0.2	
9.4			26	51.2		9.5		41	41	12.4		9.5			9	23.2		9.5		4	15	8.2		8.2		38	30	31.2	F

701—760				
	21h—23h		+80°	
m	h	′ ″	′	
9.4	21	40 53	40.0	
9.4		41 59	44.4	B
8.8		42 7	1.7	A
9.5		45 7	15.5	
9.5		47 25	52.8	
8.2		49 6	1.7	A
9.1		46	26.2	s
9.4		53 19	41.2	
9.5		58 32	52.3	
9.4		55	33.0	
9.4	22	0 46	32.5	
9.5		1 15	1.9	
9.5		41	56.8	C
9.5		2 38	37.7	
9.4		49	22.0	
9.3		3 50	50.3	
9.5		6 21	33.2	
9.5		7 4	17.6	
9.5		8 41	25.4	
9.1		16 22	51.0	
9.1		17 37	44.6	
9.0		25 59	40.6	
9.5		28 33	14.1	
8.7		29 26	5.8	S
9.3		44	45.8	
9.4		32 26	30.3	
9.5		33 16	25.4	
9.1		34 1	7.2	R
9.5		8	50.5	
9.0		38 49	2.0	A
6.7		39 6	36.3	G
9.5		40 44	26.8	
9.4		46 54	25.4	
9.3		49 18	43.7	
9.5		50 17	11.5	
9.5		52 30	6.7	
8.9		43	54.2	s
9.3		53 16	50.2	
7.9		19	31.2	F
9.5		26	46.5	
9.5		54 19	13.6	
9.5		55 34	46.8	
9.0		43	29.9	s
9.5		57 2	10.1	
9.1		37	57.8	C
9.5		58 32	24.5	
9.5		35	57.0	C
9.5		59 27	4.9	
9.2	23	1 31	52.8	
9.5		3 52	14.6	
9.5		5 39	28.4	
9.0		7 42	13.2	s
9.5		8 0	26.5	
9.0		8	33.9	s
8.5		9 19	58.8	s
9.5		11 16	31.9	
9.5		17	58.3	C
8.9		14 1	38.4	
9.5		41	18.5	
9.2		15 1	46.9	

761—793				
	23h		+80°	
m	h	′ ″	′	
9.5	23	15 28	19.0	
9.2		52	53.4	
9.4		16 54	39.0	
9.1		21 32	8.7	s
9.4		39	19.3	
8.7		22 11	52.9	s
9.5		52	37.6	
9.3		23 48	23.0	
9.4		25 33	16.7	
8.2		50	12.4	F
9.4		27 15	27.1	
9.5		20	22.6	
8.5		55	16.6	F
8.7		29 40	52.9	F
9.3		30 15	13.7	
8.3		56	41.9	B
9.5		32 15	45.1	
8.5		26	32.4	F
9.4		35 32	28.4	
7.8		37 7	29.9	F
9.0		38 49	18.1	
9.2		39 7	49.8	
8.7		37	24.0	F
8.0		40 34	33.9	F
9.2		49	13.3	
9.5		43 39	35.6	
9.5		46 40	33.1	
9.5		49 33	42.4	
9.4		50 25	40.1	
9.0		41	19.0	
8.4		57	32.5	F
9.5		51 7	58.7	C
8.8		58 9	16.6	F

Zone +81°

0—20				
	0h		+81°	
m	h	′ ″	′	
9.5	0	2 18	55.1	
9.5		3 46	10.5	
9.5		4 44	13.0	
9.3		11 23	0.0	
9.5		16 45	11.6	
9.5		53	25.2	
9.5		17 34	53.7	
9.5		19 27	4.7	
9.4		41	52.3	
9.5		21 18	47.6	
9.5		26 39	19.8	
9.5		28 50	23.7	
6.5		29 1	41.6	G
9.5		30 25	32.3	n
9.3		33 4	31.5	
9.2		36 42	38.1	
9.3		37 46	10.1	
7.6		38 28	10.5	F
9.5		39 57	12.8	n
9.0		41 34	59.6	s

21—80				
	0h—2h		+81°	
m	h	′ ″	′	
9.3	0	41 54	58.1	
9.2		42 4	7.5	
8.9		44 46	53.9	s
9.5		49 6	49.9	
7.5		39	5.6	F
9.5		50 36	10.6	n
8.6		56	19.3	
9.0		51 7	45.7	
8.6		35	28.1	
8.3		52 29	10.9	s
9.5		55	38.2	
9.4		55 10	31.5	
9.5		59 9	22.9	
8.7		25	0.4	
9.5	1	0 21	12.5	
9.5		41	8.0	
9.5		4 26	21.3	
9.5		8 39	30.7	n
9.0		10 36	58.2	
9.5		17 32	38.6	
9.5		18 8	40.4	n
9.0		59	9.3	s
9.3		20 49	30.0	
9.5		22 3	40.8	
9.5		57	16.6	
9.5		59	10.2	
8.8		25 11	20.0	
9.3		26	19.9	
9.5		26 24	2.8	
9.5		27 55	9.4	n
8.7		28 56	44.8	
9.5		30 14	2.9	n
9.5		18	9.7	
9.0		31 12	31.4	
9.5		47	39.7	
9.2		33 19	57.6	
8.6		29	5.0	s
9.2		34 22	51.2	
9.5		35 25	13.0	
9.5		36 44	33.1	
6.8		38 24	14.3	F
9.3		34	55.1	
9.3		40 45	44.1	
8.9		44 3	4.5	
9.3		31	40.4	
9.5		37	55.6	n
8.4		53	50.6	s
9.0		46 22	45.5	
9.2		47 28	37.3	
9.5		53 47	30.8	
9.5		55 53	6.8	n
9.4		56 21	50.1	
9.5		57 53	7.1	n
9.5		59 42	6.8	
9.5	2	3 27	6.8	
9.5		6 39	31.0	
8.8		8 47	42.6	
9.0		9 25	15.9	
9.4		41	27.3	
9.0		13 6	41.4	

81—140				
	2h—3h		+81°	
m	h	′ ″	′	
9.0	2	14 41	27.4	
9.1		15 0	9.6	
9.3		18 40	11.3	
9.5		19 9	36.9	
9.5		25	20.2	
9.5		21 1	18.1	
9.3		22 22	41.7	
9.1		24 46	2.7	
9.3		25 14	1.8	
8.5		26 32	14.5	
9.4		28 57	1.5	
9.1		29 17	21.5	
9.2		32 31	16.7	
9.5		49	59.3	
8.6		54	47.3	s
8.5		34 44	14.3	
9.5		38 36	28.8	
9.2		42 42	31.3	
9.5		50 15	52.6	
9.1		53 35	19.9	
9.5		54 29	18.1	n
9.3		58	32.6	
9.5		55 12	57.6	
9.5		32	20.3	n
9.5		56 11	16.7	n
9.4		57 18	50.4	
7.4		59 17	36.5	F
9.1	3	3 36	26.2	B
9.4		8 32	27.5	
9.5		53	30.8	
9.3		9 21	12.6	
8.4		10 59	17.1	F
9.5		12 32	40.8	
9.1		54	2.0	
9.4		13 3	32.0	n
9.0		29	35.9	
8.8		14 44	0.2	
9.5		15 19	4.5	
9.5		17 29	50.5	n
9.5		19 57	4.2	
9.2		23 37	24.8	
9.5		27 28	32.5	
9.5		38	8.3	n
9.5		28 15	6.5	n
7.9		49	5.7	
9.5		29 14	41.5	
9.4		28	7.0	
9.3		31 30	40.9	
9.0		33 5	48.7	
9.5		6	15.3	
9.0		11	49.0	
9.2		36 0	35.1	
9.4		16	7.2	
7.8		37 38	26.8	F
7.8		38 9	8.8	F
9.5		39 53	21.1	n
9.3		41 21	19.3	
9.5		42 17	56.1	
9.1		44 31	16.9	
9.3		45	31.9	

141—200				
	3h—5h		+81°	
m	h	′ ″	′	
9.5	3	46 34	4.9	
9.5		48 32	47.8	n
9.5		49 21	25.4	
9.5		57	1.9	
9.5		51 10	47.8	
9.5		53 7	57.2	
7.5		46	35.8	s
9.3		48	1.8	
8.3		55 10	3.1	s
7.9		40	15.4	s
9.5	4	2 21	28.5	
9.3		6 0	59.9	
9.5		7 5	48.9	n
9.4		8 18	49.8	
9.4		48	28.6	
9.5		9 53	31.2	
9.5		15 10	4.9	
9.5		17 23	55.9	
9.5		19 32	51.0	
9.3		23 20	41.1	
9.4		24 40	15.5	
9.2		26 5	12.8	
9.5		53	9.0	
9.2		27 13	11.5	
9.5		13	26.2	
9.4		28 2	48.3	n
8.9		56	19.8	s
8.5		30 59	22.6	s
9.3		32 57	4.8	
8.4		35 51	1.7	F
9.2		37 46	45.0	
9.5		39 9	47.2	
9.5		43 41	54.1	
9.4		45 53	45.5	
9.3		48 18	17.5	
9.5		49 31	20.2	
9.2		50 13	44.9	s
8.7		52 0	2.3	F
9.5		16	31.1	
9.1	5	0 16	12.6	
9.5		4 17	8.1	
9.5		59	57.9	
8.6		5 28	33.9	
9.3		6 37	30.4	
9.5		7 47	6.4	
9.5		9 33	5.2	
8.6		11 41	16.5	s
9.2		13 42	2.1	
9.4		15 6	12.3	
9.4		17 53	33.7	
9.5		20 15	18.6	
8.6		25 50	43.2	
9.5		27 35	49.5	n
8.0		29 36	18.5	s
9.5		31 32	18.1	
9.4		32 41	42.7	
9.4		35 8	1.1	
9.2		36 16	26.6	
9.2		53	31.6	
9.2		53	26.3	

+81°

201—260					261—320					321—380					381—440					441—500				
	5ᵘ—7ᵘ		+81°			7ᵘ—9ᵘ		+81°			9ᵘ—11ᵘ		+81°			11ᵘ—13ᵘ		+81°			13ᵘ—15ᵘ		+81°	
m	u	′	″ ′		m	u	′	″ ′		m	u	′	″ ′		m	u	′	″ ′		m	u	′	″ ′	
8.8	5	41	13 30.8		9.5	7	43	34 4.5		9.3	9	42	54 23.6		9.0	11	30	45 8.0	s	9.2	13	40	9 46.2	s
9.5			59 37.5		9.5			37 21.3		9.5		47	46 23.2		9.5			56 2.3		9.4		41	20 55.9	
9.3		42	31 6.3		8.1		46	18 27.2	s	9.5			49 23.2		9.5		31	14 20.4		8.5		42	1 47.2	F
9.2		43	57 5.3		9.5		48	14 38.2		9.5		50	49 30.9		8.5		32	54 23.1		9.0			35 54.7	S
9.5		44	17 51.5		9.5		49	46 44.7		9.1		51	47 3.0		9.3		37	11 51.9		9.5		43	10 47.4	
9.5			51 42.5		9.5	8	13	36 49.6		9.5		56	15 59.9		9.5		42	1 28.8		9.5			48 7.8	
9.4		45	6 3.3		9.5		21	46 12.9		9.2			58 29.3		8.9		47	10 48.0		8.9		44	30 27.0	s
9.5		49	9 32.5	n	8.9		22	53 31.9		9.5		58	45 59.8		8.0		50	14 26.5	G	9.3		45	59 17.9	
9.5			11 2.1		9.5		23	19 57.7		9.5		59	8 38.2		6.2		52	38 39.7	G	9.1		49	38 59.6	
8.7			19 57.9	s	8.0		26	32 0.2	s	9.1			54 14.1		9.4		54	30 16.2		9.5		50	12 4.1	
9.5			33 3.0		9.4		32	16 14.0		9.5	10	0	57 47.5		9.4		58	32 6.9		9.4		52	20 38.1	
9.5		51	26 58.9		9.3		33	34 16.3		9.4		3	16 4.5		9.1		59	25 37.5		6.8		53	16 28.9	G
9.5		53	56 14.9		7.6		35	11 49.4	F	9.5		5	52 44.9		9.5	12	0	35 33.0		9.5		54	38 31.2	
9.0		54	21 46.9		8.6		36	26 20.1		9.5		9	54 4.7		9.5		3	3 19.3		9.5		57	7 29.1	
8.9		55	0 8.1		9.5		40	58 10.0		9.4			55 24.8		9.5		11	35 35.0		9.5			59 5.9	
9.5	6	4	20 16.9		9.4		43	26 52.2		9.2		10	15 28.5		9.0		14	38 1.5		9.2		59	5 35.1	
9.5		6	45 9.2		9.3			59 37.9		7.9		11	48 55.2	F	8.5		18	42 37.8		9.2	14	2	41 6.3	
9.0		7	21 24.1		7.9		45	25 36.4	S	9.5		13	19 27.4		9.5		24	41 15.0		9.5		4	40 54.4	
9.5		10	30 13.2		8.4		46	7 39.4	s	9.3		14	54 44.7		8.1		28	48 44.7	s	9.5		7	14 26.7	
9.5		14	48 54.5		9.5		48	24 17.1		9.5		16	0 59.7	n	6.8		29	41 3.0	G	9.4			27 51.0	
9.3		15	1 43.7		9.5			36 54.5		9.1			37 39.1		9.5		32	36 10.1	n	9.4		8	20 33.8	
9.2		16	45 55.9		6.7		49	13 24.1	G	9.5		18	40 51.1		6.3		40	46 25.0	G	9.4		10	38 0.7	
9.5		17	36 53.0		9.5			59 43.2		6.2		20	49 14.3	G	9.5		41	30 16.7		9.5		11	4 29.5	
9.5		18	59 24.0		9.3		51	31 41.9		9.1		22	45 47.6		9.5		42	20 12.8		8.8			24 50.5	s
8.4		20	36 15.7	F	8.7		54	4 35.2	F	9.2		25	41 53.4		9.5		43	50 55.6		9.5			29 18.1	
9.5		28	0 51.1		9.2			31 7.0		9.4		26	15 46.0		9.5		44	27 38.7		9.4		12	28 33.5	
8.8		30	53 5.1	s	9.3		57	42 14.5		8.4		27	21 59.3	s	7.6		45	34 11.8	F	9.5		15	19 8.5	n
9.1		36	23 11.6		9.5		58	56 59.2		9.5		28	52 35.5		9.4		46	13 17.3		9.5			54 7.9	n
9.0		38	24 56.2		9.0		59	4 58.9	S	6.2			55 10.9	G	9.2		48	12 50.5		9.2		18	15 49.3	
9.5			55 2.6		9.5	9	0	1 30.3		9.0		33	34 3.5		9.5		51	0 46.8		9.2			48 54.5	
8.9		40	15 23.7		9.1		1	30 27.3		9.4		37	34 19.4		9.3		54	35 8.9		9.5		19	36 35.5	n
9.5		41	58 13.6		9.1		3	26 53.0		9.3		38	38 21.2		7.0		58	3 39.4	F	9.3		20	1 30.8	
9.1		42	12 46.8		9.5		4	42 46.8		9.4		39	14 26.1		9.5	13	4	14 58.2		9.5			10 36.8	
9.4			39 33.8		9.5		5	35 30.8	n	8.9		41	15 7.4		9.3		9	41 8.3		9.5		25	41 9.7	n
9.5		46	14 31.8		8.6		6	13 9.4		9.4		42	53 18.1		9.5		10	36 31.7		9.4			43 41.1	
9.2		47	30 13.7		9.5			26 16.7		9.5		43	25 49.4		6.3		11	12 14.4	G	9.0		26	40 9.1	
9.1			32 15.8		9.0		7	23 12.7		9.5		45	39 15.7		9.5		12	35 23.1		8.6		28	10 14.3	s
9.5		53	37 30.5		9.3		13	2 55.9		9.2		51	37 50.0		9.5		14	9 25.1		9.5		29	5 23.6	n
7.8			49 6.2	F	9.4		14	13 16.6		8.2		52	29 49.2	F	9.3		16	19 16.7		9.0			36 41.9	
9.5			56 24.2		9.3			51 20.5		8.6		56	27 13.3		9.1		18	16 3.2		9.4		31	14 47.3	
9.5		55	26 8.9		9.5		15	44 12.2		9.5		57	1 45.7	n	9.1		19	37 1.3		9.5	•	33	43 50.1	n
6.3		57	39 30.4	G	4.3		16	3 57.6	G	8.2		58	33 44.0	F	8.8			46 23.0		6.7		34	47 27.1	F
9.0		59	41 13.8	s	9.5		18	11 15.8		9.4	11	1	11 18.1		9.3		21	15 2.6		8.7		35	59 12.0	s
9.5	7	0	8 18.1		9.5			18 44.2		9.0		3	1 30.5		9.3			19 39.1		9.5		37	28 18.1	
9.5			44 22.3		9.5		20	48 54.1		9.3			35 55.7		9.5		23	11 47.4		8.7		40	13 19.9	s
9.2		2	9 5.5		9.5		21	35 0.4		8.3		7	27 46.0	F	9.5		24	49 49.9		9.3			42 14.7	
9.5			23 33.1		9.5			56 39.5		9.4		12	41 21.2		9.2		25	38 12.4		9.3		41	31 24.7	
9.5		4	17 8.1		8.9		22	14 18.5		9.5		14	27 38.5		9.4			54 55.0		9.1		42	39 53.3	
9.5			38 49.8		9.5			15 7.1		9.0		16	3 20.8		9.3		26	11 46.7		8.9		48	23 47.3	
9.5		5	31 17.3		9.5		23	3 8.1		9.5		19	28 50.3		9.2		28	58 30.3		9.5		49	2 38.4	
9.5			58 58.0		9.4			18 18.6		8.0			35 50.1	S	9.2		30	8 31.4		9.3		50	30 8.7	
7.0		8	3 10.7	G	9.5		27	6 18.7		9.3		21	14 6.5		8.9			27 1.5		9.3		54	15 26.1	
9.4		18	12 34.3		9.0		30	47 37.1		6.2			26 55.5	G	9.0			27 2.6		9.5		56	28 35.0	n
9.5		27	3 39.9	n	9.3		34	34 42.8		9.5		24	42 5.3		9.5		31	7 24.3	n	9.3		57	10 57.5	
9.5			41 39.7	n	9.5		36	57 59.1	n	9.0			43 37.1		8.9		33	3 3.9	s	6.8			12 20.1	F
9.5		29	22 25.2		9.4		38	35 26.7		9.3		25	55 5.4		9.3		34	13 32.0		9.3	15	0	48 17.6	
7.2		30	22 42.5	s	9.5			53 10.6		9.4		28	9 38.8		9.5			29 43.5		9.5		2	48 41.3	
9.4		35	41 37.2		9.3		39	14 47.3		9.4			54 16.3		9.5			39 6.4		9.5		5	54 37.6	
9.5		36	24 5.9		7.4		41	3 3.7	S	9.0		29	12 32.8	R	9.5		35	18 6.4	n	9.5		6	41 46.6	
9.5		42	28 37.1		8.4		42	45 5.4	s	9.0		30	27 54.0	R	8.7		38	10 13.2	s	9.5		8	23 51.2	

501—560					561—620					621—680					681—740					741—800				
	15u—16u		+81°			16u—18u		+81°			18u—19u		+81°			19u—21u		+81°			21u—22u		+81°	
m	u ′	″	′		m	u ′	″	′		m	u ′	″	′		m	u ′	″	′		m	u ′	″	′	
9.5	15 10	27	44.1		9.3	16 58	8	5.6		8.7	18 23	36	24.9	s	9.5	19 54	8	3.6		9.5	21 30	56	34.6	
9.4	12	46	32.2		9.5	40		43.9		7.2	26	44	24.4	s	9.5	13		40.1		8.0	32	22	5.9	F
9.5	15	11	27.5	n	9.5	59	4	14.2		9.5	31	46	7.6		9.4	55	55	18.1		9.3	34	1	51.0	
8.9	19	31	13.6	s	8.7	17 2	4	30.3	s	9.5	32	44	4.4	n	9.5	56	16	25.1		9.2	35	20	33.2	
9.1	22	47	8.5		9.5	37		7.1		9.5	33	33	50.0		9.5	31		21.1		9.5	35		36.4	
9.5	23	36	33.1		9.5	6	1	12.5		9.4	35	1	2.7		9.5	57	21	14.0		9.5	38	15	46.8	
9.5	26	6	39.8		9.5		38	9.3		9.5		36	45.3		7.7	59	24	12.0	F	9.5		53	14.1	
9.4		28	27.7		7.3	8	38	3.6	s	9.3	36	33	6.6		9.4	20 1	30	33.9		9.5	40	41	55.3	
8.7	29	2	38.9	s	8.5		52	26.4	s	9.4		42	40.1		8.6	5	59	29.4		9.5	41	22	58.8	
7.8		34	32.8	P	9.5	10	53	1.9	n	9.5	37	50	19.7		9.5	6	14	37.3	n	9.2	44	0	27.0	
9.2	31	1	33.6		9.0	13	43	54.1		9.5	38	14	16.4		8.9	7	52	44.2		9.3		3	9.1	
9.5	32	19	57.8	n	9.5	14	10	40.4	n	9.2	39	33	4.9		9.4	10	14	13.3		9.2		14	20.5	
9.5		32	2.1		9.4	16	34	3.9		9.5	40	36	4.2		9.5		18	31.0		9.4	47	33	58.2	
9.1	33	27	49.9		8.3	18	3	32.6	s	9.5	42	46	14.4		9.5	11	7	11.3		9.5	48	46	27.0	
9.5	34	51	23.3		9.5	19	2	55.7		9.5	43	46	21.0	n	9.4	12	48	36.5		9.5	49	12	40.7	
9.2	37	31	5.8		9.5		44	50.2		9.5	44	19	23.0		9.2	17	45	3.3		9.5		54	52.5	
6.8	38	54	15.0	F	9.4	23	12	16.4		9.5	45	46	35.3		9.4		50	46.8		9.4	50	26	33.8	
9.0	42	9	31.5	S	9.1		55	26.9		9.1	48	46	59.7		8.6	18	30	0.7		9.5	53	2	2.2	
9.5		21	36.3	n	9.1	26	36	47.3		9.2	49	6	46.5		7.5	19	1	46.3	F	9.5		3	47.5	
9.5	43	36	21.9		9.5	27	38	45.7		9.3		14	12.5		9.5		50	39.5		9.4	22 0	12	36.2	
9.5		50	56.3		9.5		40	26.0		9.4	51	14	9.1		9.5	21	55	6.9		9.5		1	7	20.8	
9.5	45	29	33.9	n	9.3	30	13	58.7		9.1	54	25	23.7		9.5	22	7	21.2		9.2		2	40	8.7	
7.3		55	4.3	F	9.5	32	6	28.8	n	8.2	57	37	2.4	s	9.5	25	36	57.9		9.5		4	31	40.9	n
9.3	47	36	54.2		9.2		27	13.3		9.0	58	50	34.2		9.5	26	4	20.9		9.4		5	45	39.0	
9.5	48	9	27.5		8.6		47	29.9	s	9.5	19 0	26	31.5		9.5	28	52	58.0		9.5		8	33	52.8	
9.5		34	26.1		9.2		58	11.7		9.5	6	19	34.4		7.4	32	3	53.3	G	9.4		9	22	47.0	
9.5	49	44	49.5		9.5	34	55	56.3	n	9.5	7	39	38.0	n	9.5	35	22	38.2		7.7			59	56.8	L
9.2	51	23	48.8		8.8	35	36	29.7	s	9.5		45	58.0		9.5		29	40.2	n	9.5		10	11	27.7	
9.4	54	5	37.8		9.3	37	17	8.4		9.2	12	21	28.7		9.3	38	24	12.4		9.5			59	23.3	n
8.4		18	45.3	s	9.5		31	23.3		9.4	14	5	34.0		8.5	41	28	25.8	s	8.9		17	35	38.3	
7.4		40	22.1	F	9.5	38	11	9.4		9.5	15	53	58.4		9.0		33	21.5		9.5		19	10	57.5	
9.4	56	48	42.2		9.4	43	37	30.7		9.5	16	39	6.9		7.5	44	24	29.5	L	9.5		22	2	26.2	
9.4	58	49	54.2		9.5	44	35	23.9		8.7	17	20	24.8	s	9.5	45	33	29.3		9.3			21	25.4	
9.5	16 1	1	28.0		9.5	48	11	5.3	n	9.3	23	15	36.9		9.5	47	36	50.2		9.5		23	46	33.3	
9.5	2	43	27.7		9.4		38	30.3		8.3	24	2	0.3	s	9.5	49	33	6.0		7.0		24	4	12.0	F
8.7	4	23	2.6	s	9.5	49	42	8.3	n	9.2		55	57.1		9.4	50	4	58.5		9.5			21	41.0	
9.4	5	28	20.6		9.5	51	10	45.2		9.3	25	24	39.5		9.5		22	16.3		9.4			38	45.0	
8.0		57	14.5	s	9.5	52	37	37.7		9.4		42	21.8		6.0	52	48	59.4	G	9.5		25	18	44.6	
9.5	8	30	47.8		9.5	55	12	5.0		7.9	27	57	22.0	s	9.5	53	57	37.5		9.5		26	43	38.3	
9.1	9	10	10.0		9.5		53	24.8		8.0	28	19	39.2	s	9.5	54	38	28.5	n	9.5		28	45	40.2	
7.3	10	46	0.8	F	9.3		54	45.8		9.4		52	52.5		8.9	58	3	16.2		8.5		29	25	24.7	s
8.5	19	25	4.0	s	9.4	56	9	55.1		9.3	29	6	17.4		9.5	59	12	43.9		9.2		30	20	7.8	
8.2	21	36	30.0	F	9.5	57	35	5.5		9.5		23	3.8		9.5		22	13.2		9.3		31	35	19.6	
9.5	23	53	54.4	n	9.5	59	17	20.6	n	9.3		39	25.7		9.5	21 1	37	42.6		9.5		34	8	43.8	n
9.5	24	16	19.5		9.4		31	20.6		8.8	31	28	49.9		8.0	2	57	14.2	s	9.4		36	48	31.6	
9.5	25	13	10.0		9.5	18 1	0	9.7		7.5	32	41	30.0	s	9.5	11	41	24.6		8.8		37	15	18.3	s
9.5	27	24	33.7		9.2	3	58	13.1		9.5		51	17.2	n	9.5	12	4	9.1		9.5		42	22	32.6	
9.5	28	52	0.2		9.1	4	52	9.1		8.3	34	18	27.7	s	8.8	13	24	41.7	s	7.7			46	8.1	s
8.2	29	4	16.8	s	9.5	5	18	51.7		9.5	36	32	54.6		8.7		36	45.2	s	8.0		43	10	43.9	s
9.5	30	32	7.7	n	8.9	6	35	39.7	s	9.0	39	50	49.5		9.5		16	4	43.7	9.0		44	0	10.0	
9.1		41	47.8		8.7	7	7	18.7	s	9.5	40	39	32.9		9.5		18	25	41.2	9.5		45	12	44.4	
8.5	33	24	2.5		8.9	9	24	34.5		9.5	41	35	46.2		9.5	21	18	34.6		9.5			41	29.4	
9.3	36	22	44.8		9.5	11	6	12.0		9.4	42	34	5.5		9.5		59	27.4		9.5		46	12	55.8	
9.5		37	43.8		9.5	15	30	41.1		9.5	46	41	53.5		9.5	22	28	31.1	n	9.5		48	4	30.5	
9.2	43	41	58.7		9.5	16	19	9.8		8.8	47	22	0.3		7.8	23	33	8.5	F	8.9			15	10.2	s
9.4	46	18	16.3		9.5	17	1	10.5		9.2	48	38	14.8		7.9	24	41	23.9	F	9.5		49	32	6.0	
9.4	47	41	34.3		9.5	18	34	32.6		9.5		42	30.7		7.5	25	10	53.5	S	9.0		50	5	1[illegible]	
9.5	50	46	10.7		9.4	19	20	26.2		9.4	50	26	55.6		9.5		41	5.5		9.5			30	[illegible]	
9.5	51	53	17.5		8.5		23	26.5	S	9.3	51	1	57.0		9.2	27	29	24.8		9.2		51	7		
9.4	53	31	27.1		9.5	21	40	28.0		9.5	52	9	42.3		9.5	29	55	59.4		9.5		52	4[illegible]		

+81° & +82°

| 801—844 | | |

251—310					311—370					371—430					431—490					491—550				
	8u—10u		+82°			10u—12u		+82°			12u—14u		+82°			14u—16u		+82°			16u—18u		+82°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
8.7	8	18	35	49.7	F	9.4	10	26	20	8.4		9.5	12	39	2	33.6		9.3	14	44	55	1.8		9.5	16	38	11	54.9	
9.3		19	4	5.7		9.5			59	59.9		9.3		41	6	29.1		9.5		45	3	59.9		8.8		40	46	11.0	
7.0			44	44.4	G	8.9		28	25	19.3		9.5		42	46	24.5		9.5		46	54	10.2	n	9.5		46	53	8.8	
9.5		21	34	9.7		9.5		35	53	37.2		8.5		44	15	29.7		9.5		47	10	10.6	n	9.5		47	9	31.3	
9.4		26	38	27.1		9.5		36	6	27.8		9.3			30	3.5		9.5			19	29.2		9.5		55	21	44.0	
9.3		27	57	52.9		9.4			59	5.2		9.3		45	34	22.4		9.5		50	36	28.8		8.5		56	53	36.7	S
9.5		28	49	48.7		9.5		38	16	23.7		9.3			52	21.1		9.2		51	11	44.3		8.3		58	32	5.0	
9.3		33	18	41.4		9.5		40	16	36.8		8.5		52	55	56.4		8.6		55	38	9.4	s	4.0	17	0	59	16.1	S
9.1			19	22.0		9.5		46	56	37.0		9.3		53	3	9.8		9.2		57	52	58.0		9.0		1	37	9.5	
9.4		34	15	58.0		8.8		47	2	2.1		9.5		57	21	26.7		9.1	15	1	30	11.7		9.5		2	0	3.6	
9.2		40	33	31.4		8.8			21	57.0		9.5	13	0	0	33.5		9.2		2	6	28.3		9.5		5	32	50.9	n
9.5		41	58	56.2		8.5		48	18	27.3		9.5		3	12	8.6		9.5		12	4	5.9		9.4		8	35	14.9	
9.3		50	41	31.2		9.5		53	42	46.4		9.5			33	1.3		8.8		14	34	53.9	s	9.5		9	17	14.9	n
9.5		53	32	17.6		9.3		54	20	35.3		9.5		4	26	14.2		9.4		16	1	20.5		9.0		11	22	43.3	
8.8		56	12	56.1	s	7.0		58	0	31.4	F	9.5		7	24	13.1		9.4			51	52.6		8.3		15	10	4.7	
9.5	9	0	0	21.0		8.6	11	1	1	59.4		9.5		14	4	18.7		9.3			56	37.5		9.5		17	37	20.7	
9.5		3	5	51.9		9.5			1	10.5		9.5		15	14	36.9		9.5		18	31	15.5		9.0		18	3	28.9	s
8.5		4	3	28.7	s	9.5		8	2	29.4		8.5			29	51.8		9.5		20	43	41.7		9.0		19	53	40.1	
8.5			24	53.3		9.5		11	9	41.6		9.1			41	56.9		9.3		22	54	25.9		9.5		23	49	26.4	
9.5		8	29	41.4	n	9.5		14	5	21.0		8.4		16	38	16.0	F	9.4		23	14	45.0		9.4		25	10	19.7	
8.7		9	32	42.7		9.5		15	39	8.1		9.0		17	6	12.3		9.5		27	53	3.9		9.5			43	19.3	
9.2			58	53.4		8.3		19	19	53.7	s	9.5		20	44	12.2		9.5		28	40	41.4		9.5		26	48	5.1	
9.5		10	35	46.9	n	9.5		20	34	41.5		8.5		22	43	15.3		9.4		29	18	3.2		9.5		27	50	16.6	
9.0		12	8	8.0	R	9.5		22	2	10.3		9.4			49	5.4		8.8			36	29.7	s	9.5		29	17	8.7	
9.5			9	39.9		9.2			25	51.5		8.5		28	47	0.8		9.5		30	50	18.8		9.5			39	45.2	n
9.5			27	4.3		9.4		24	5	28.7		9.5		31	48	36.4		8.2		35	23	23.2	F	9.5		30	39	45.0	n
9.2		13	0	12.9		9.0		25	52	5.1		8.6		32	50	44.3	s	9.5		36	49	59.5		9.5			40	33.6	
9.5		16	44	44.5		9.0		26	8	5.9		9.5		34	22	43.1		9.5		37	53	42.5		8.5		31	9	27.7	s
8.8		22	3	12.9		9.5		27	53	8.9		9.5		35	47	5.8		9.3		38	55	33.9		9.4		32	30	42.4	
8.5		23	50	15.0		9.1		29	4	40.3	R	8.9		38	35	32.1		9.4		40	34	28.9		9.5		34	43	42.7	
9.4		24	22	39.2		9.3			8	24.0		9.5			49	6.3		9.5		41	32	59.0		8.5			58	50.8	s
9.4		31	54	41.6		8.0			59	53.1	s	9.0		42	47	26.0		9.4		42	10	11.1		9.2		39	53	25.7	
9.2		32	4	40.9		8.6		33	41	18.4		9.5		46	6	16.3		7.5			13	44.4	G	9.0			58	42.0	s
9.5			12	45.4		9.4		34	13	34.6		9.1		56	22	42.1		8.5		48	14	17.4	s	9.1		40	33	3.5	
9.4		33	32	10.2		9.4		38	7	37.8		8.7		58	12	32.3		9.1		50	52	49.3		9.2			52	23.4	
9.0		35	51	25.9		9.5			18	29.3		9.5			12	44.4		9.5		51	23	1.1		9.5		41	44	35.9	n
9.5			56	13.0		8.8		45	2	46.8		8.2	14	0	28	19.0	F	9.5		55	53	52.1	n	9.5		42	15	31.7	n
9.3		39	4	55.9		8.3			43	44.6	s	9.5		1	16	37.1		9.4		56	51	20.3		9.4		43	13	45.2	
9.5		41	8	57.5		9.5		48	39	35.7		9.3			18	22.2		9.0		57	37	52.3		9.0		44	43	37.7	
9.5		43	56	12.8		8.8		50	0	4.3		9.5		7	55	6.0		8.2		59	33	47.8	F	9.5		47	47	55.8	
9.5		45	15	20.6		8.8			12	59.3	s	8.5		10	19	17.5		9.5	16	0	34	31.2	n	9.3		55	53	11.7	
9.4		51	7	58.8		9.5			19	32.4		9.3		12	39	51.5		8.6		2	4	46.3	s	9.4		56	32	10.1	
9.5		52	38	47.0		9.5		51	54	49.2		9.4		17	57	42.1		9.5		3	10	22.7		9.5			38	32.2	
9.5		57	11	11.0		9.5		52	0	12.4		9.5		19	26	45.7		9.5		8	12	24.1		9.0	18	3	22	53.7	
9.5			17	32.2		7.6		55	53	29.8	F	9.0			47	29.3		8.6		12	5	56.3	s	8.8		4	24	25.3	
9.5	10	2	29	34.2		6.7	12	4	23	31.0	s	9.5		20	46	43.2		9.5		14	2	30.3		9.5		5	31	18.3	
9.5		5	49	30.4		8.9			56	31.3	F	8.5		21	18	21.2	s	9.0		16	10	4.6		8.3		13	54	28.1	s
9.5		6	55	51.0		9.3			56	14.7		9.4		24	25	1.6		9.5		18	20	47.1		9.5		16	28	48.9	
9.1		8	32	6.9		9.3		6	51	26.4		9.5		31	16	29.4		9.0			37	50.7	s	8.7		24	53	20.9	s
8.1		9	3	14.1	F	9.4		9	9	8.4		9.3			53	13.9		9.5		19	38	10.7	n	7.5		28	37	52.2	s
8.6			23	0.1	s	9.2		15	32	1.3		9.5		32	19	3.2		8.5		24			F	9.2		29	11	28.3	
9.5		11	6	52.2	n	9.5		19	35	34.3		9.5		33	0	10.2	n	9.5						8.4		33	53	46.9	s
9.3		13	45	24.4		8.9		21	41	16.6		9.0			24	36.2	s	9.4								35	2	12.8	s
9.0		15	1	43.1		9.3		23	39	29.4		9.1		35	36	23.4		8.7								36	12	47.3	s
8.9			24	20.8		8.0			47	47.9	F	9.3			52	42.6		8.0								40	20	10.6	
9.5		16	43	5.7		9.5			50	9.9		9.2		36	9	41.3		9.5									27	35.7	s
8.2		17	51	46.0	s	9.5		25	29	27.6		8.8		37	21	5.1	s	9.5								42	45	2.8	n
7.7		22	24	19.9	s	8.8		29	57	43.9		9.4		38	9	54.9		9.5								43	36	6.9	n
9.5		23	28	12.1		9.2		30	38	17.5		9.5		42	24	9.6	n	9.5									41	56.4	
9.0			57	40.9		9.4		35	54	2.1		9.5		44	54	53.6	n	9.5								4	48	0.2	

+82° & +83°

551—610

	18u—20u	+82°	
m	u ′ ″	′	
9.5	18 45 30	27.3	n
9.5	46 26	15.5	
9.4	47 37	9.9	
9.3	48 50	34.2	
9.5	50 27	4.8	n
9.5	29	58.2	
9.5	58	13.7	
9.5	52 19	14.7	
9.5	54	9.3	
9.5	54 55	14.3	
9.3	55 7	31.8	
8.5	58 2	4.6	s
9.5	19 0 0	0.8	
9.3	17	49.3	
9.3	3 36	31.3	
9.5	5 41	32.5	
9.5	7 24	59.1	
9.5	8 9	19.1	
9.5	38	28.6	
9.5	40	31.3	
9.5	9 14	30.2	
6.0	23	9.3	F
9.5	10 5	52.0	
9.5	8	53.5	n
9.5	12 12	3.1	
9.5	15 31	59.5	
9.4	16 25	1.2	
7.7	35	28.1	s
9.5	19 27	12.9	
9.3	25 21	16.1	
9.5	46	15.7	n
9.5	27 38	21.5	
9.5	28 41	46.3	
9.4	49	13.9	
9.5	31 9	7.1	n
9.4	32 56	28.0	
9.5	35 48	17.7	
9.4	38 13	36.1	s
9.5	40 0	18.7	
8.5	41 16	27.1	
9.3	42 12	25.6	
8.3	50 40	59.6	s
9.5	54 7	55.4	n
9.5	58 41	44.7	
9.5	59 28	18.2	
9.5	20 0 53	58.9	n
9.3	1 11	37.6	
7.6	2 53	3.7	F
9.5	4 4	39.6	
9.4	5 16	23.6	
9.5	6 4	11.8	
9.5	31	19.8	
9.4	8 2	6.0	
9.5	5	55.8	n
9.4	42	53.6	
9.5	10 56	13.3	
8.6	12 24	53.5	s
8.5	14 33	59.4	F
8.5	17 9	24.1	s
9.5	24 35	58.6	

611—670

	20u—22u	+82°	
m	u ′ ″	′	
9.1	20 28 47	34.7	s
9.4	29 50	4.7	
8.5	33 5	21.9	s
9.5	17	3.8	
9.5	53	44.8	n
9.5	37 1	35.6	
7.0	38 13	41.2	F
9.3	40 1	27.2	
9.5	35	30.9	
9.5	43 28	11.4	
9.5	44 55	41.7	
9.2	46 5	22.3	
9.3	48 8	11.9	
9.4	24	52.7	
9.4	56	51.2	
9.5	50 46	32.4	
8.6	51 29	30.8	s
9.5	52 52	7.4	
9.5	54 7	6.9	
9.2	55 1	21.6	
9.5	58 12	38.3	
9.5	21 1 2	3.7	
9.4	4 37	52.5	n
9.1	5 36	52.5	
9.3	7 0	25.1	
8.5	8 23	24.5	s
9.3	13 2	59.0	
9.5	51	40.1	
9.5	16 16	57.4	
9.4	35	13.7	
9.3	17 28	9.4	
9.5	18 50	39.2	n
9.5	19 37	47.2	
9.4	20 10	25.4	
9.5	22 9	28.4	
9.5	49	15.9	n
9.5	24 41	36.0	n
8.0	30 12	20.8	s
9.4	39	58.5	
8.6	32 32	38.8	F
8.5	33 35	55.8	F
9.5	34 30	3.1	
8.8	36	47.7	F
9.5	40 5	36.8	
9.5	42 19	24.9	
9.5	24	20.1	
8.5	43 46	15.7	S
9.5	45 20	59.6	
9.5	27	4.2	
9.5	58	46.6	
9.5	46 16	57.9	
9.5	47 20	4.4	
8.5	50 44	24.1	F
9.4	53 26	21.1	
9.5	54 5	59.1	
9.5	7	10.9	
8.7	56 28	46.1	
9.5	58	56.7	
9.5	57 14	30.2	
9.3	22 1 1	23.3	

671—730

	22u—23u	+82°	
m	u ′ ″	′	
9.4	22 2 9	37.1	
8.2	3 9	47.6	F
7.5	11	10.2	S
8.0	18	10.3	G
9.5	4 14	37.3	n
9.5	5 5	50.1	
9.3	8 19	0.6	
9.5	9 9	18.5	n
9.5	10 0	4.4	
9.5	11 7	47.6	
9.5	12 17	3.2	
8.5	14 7	51.7	s
9.5	8	56.3	
9.3	17 48	56.3	
9.5	18 9	15.8	n
9.5	20 4	17.7	
9.2	21 48	0.2	
9.0	23 4	14.1	
8.3	9	47.9	
9.5	27 48	59.2	
9.4	28 55	10.7	
9.5	30 22	1.1	
9.4	33	25.9	
9.5	31 6	31.4	n
9.5	42	31.5	n
9.4	37 4	54.7	
9.5	39 31	15.4	
9.4	41 51	1.2	
9.3	43 10	24.5	
8.0	44 7	30.5	F
9.5	47 0	1.3	
9.5	46	28.8	
5.0	55	23.1	G
8.0	48 49	55.5	s
9.5	53 57	9.5	
9.3	55 53	30.4	
8.5	56 27	16.6	s
9.5	23 3 38	1.5	
9.5	6 24	48.2	
9.4	43	1.4	
9.2	10 13	43.1	
9.0	12 45	39.3	
8.7	58	39.3	S
9.0	58	11.3	
9.2	15 23	13.1	
8.8	37	25.3	
9.5	18 8	55.7	
9.5	58	14.7	n
9.5	22 51	4.4	
9.2	23 10	57.7	
9.2	27 50	17.1	
9.3	29 16	38.9	
9.0	41	15.1	S
9.5	30 14	55.0	n
9.5	39	55.5	n
9.5	31 28	29.7	
9.2	40	57.2	
7.5	51	24.1	s
9.4	32 19	4.9	
9.5	33 49	48.6	

731—751

	23u	+82°	
m	u ′ ″	′	
9.4	23 34 53	2.6	
9.4	35 21	35.0	
8.5	51	4.2	
9.5	39 37	28.3	
8.2	40	0.1	s
8.5	42 51	10.6	
9.5	56	17.1	n
9.5	43 22	21.2	
9.5	44 25	24.9	
9.0	44	5.9	
9.5	45 38	50.8	n
9.3	51	33.7	
6.0	49 44	23.0	G
9.3	52 2	15.0	
9.5	41	0.4	
9.3	53 2	17.9	
9.5	54 29	25.2	
7.0	55 23	10.0	F
9.5	57 11	4.4	
9.4	12	51.0	
9.5	58 39	30.4	n

Zone +83°

1—30

	0u—1u	+83°	
m	u ′ ″	′	
8.5	0 1 50	20.7	s
9.5	3 55	43.1	
9.0	4 25	14.3	
9.5	8 53	8.2	
9.4	14 46	57.0	
9.5	17 46	28.2	
9.5	19 29	20.3	
9.5	25 38	25.6	
7.8	26 19	52.6	F
9.0	27 20	56.9	F
9.2	41	57.3	s
9.2	30 12	34.6	
9.5	31 30	26.9	
9.5	36 53	5.1	
8.8	37 25	50.6	s
9.5	38 8	27.2	n
9.5	30	28.0	n
9.4	43 46	48.3	
9.0	47 27	52.1	s
7.0	48 25	49.4	s
9.5	51	17.7	
9.5	55 53	22.5	
9.4	59 59	48.3	
9.5	1 0 42	29.1	
9.3	2 41	59.4	
9.5	3 2	15.8	
9.2	4 10	27.6	
9.3	6 11	2.6	
9.2	39	44.2	
9.3	8 38	58.4	

31—90

	1u—3u	+83°	
m	u ′ ″	′	
9.5	1 18 10	49.9	n
8.9	36	43.9	
9.5	24 37	32.7	n
9.5	41	7.1	
9.4	26 28	21.7	
8.9	31 10	38.9	s
9.3	32 32	41.7	
8.7	33 10	36.2	s
9.3	35 6	20.4	
9.0	37 46	10.4	
9.0	38 26	0.1	
9.5	39 44	38.6	
9.5	49	57.4	
9.5	40 8	50.0	
9.2	45 35	40.0	
9.4	52 11	15.0	
9.5	53 15	16.6	
9.5	53	57.3	
9.4	55 18	43.8	
9.3	57 4	54.2	
9.5	56	43.9	
9.1	58 54	53.6	
9.1	2 1 43	22.7	
8.9	3 4	0.3	F
9.4	9 56	56.6	
8.0	13 16	11.0	F
9.5	15 15	20.3	
9.0	36	38.2	
9.5	19 13	58.2	
9.0	23 39	14.8	s
9.4	32 17	48.7	
9.5	34 30	53.3	n
9.5	40	47.3	
9.5	37 52	10.6	
9.5	39 49	23.5	
9.5	40 44	12.1	
9.2	43 0	16.0	s
9.5	37	9.1	
9.4	45 1	27.5	
9.3	15	0.3	
9.5	46 34	27.6	
9.3	47 40	53.3	
9.2	48 38	0.2	
9.5	51 50	7.5	
9.5	52 24	51.4	
9.5	53 6	17.3	n
9.5	59 44	19.6	n
9.0	58	30.8	
8.2	3 0 6	30.5	S
9.5	19	47.0	n
9.5	36	9.8	n
9.4	5 40	56.1	
9.5	7 16	6.1	n
9.5	26	19.1	
9.5	40	20.7	
9.5	8 32	56.4	n
9.5	14 26	42.0	n
9.5	20 49	5.1	n
9.3	22 20	47.6	
9.2	24 18	6.2	

91—150					151—210					211—270					271—330					331—390				
	3u—5u			+83°		5u—7u			+83°		7u—9u			+83°		9u—11u			+83°		11u—13u			+83°
m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′	m	u	′	″	′
7.3	3	24	48	4.9	F	9.5	5	19	36	3.0		9.5	7	57	38	53.2		9.5	9	36	41	3.0		9.3	11	19	32	4.4	
9.3		27	57	2.8		9.5		21	58	33.2	n	9.3		59	13	25.8		9.0		39	15	49.7		8.8		21	4	21.1	
9.5		28	50	35.6	n	9.3		23	25	38.3		9.5			24	48.2		9.2		40	45	2.7		9.3		23	47	26.1	
9.0		33	56	7.2		9.5		28	24	26.0		9.3			44	36.8		9.5		44	38	46.9	n	9.5		24	36	47.6	n
9.5		34	17	14.8		9.4		30	33	34.2		9.5	8	3	2	56.2		9.5			44	54.9		9.3		25	17	49.2	
8.7			20	40.1		9.5		41	56	39.2		9.5		6	24	13.1	n	9.3		45	20	7.1		7.7		34	55	7.6	F
9.5		44	39	13.3		9.5		43	12	33.3	n	9.5		10	22	36.3	n	9.4		47	23	3.9		9.5		37	35	52.9	
9.5		46	1	46.6		9.2		44	29	17.8		9.5		11	57	31.2	n	9.5		48	12	40.8		9.5		41	39	52.3	
9.5			29	1.7		9.2		47	53	19.9		9.2		12	59	49.4		8.9		52	11	45.3		8.0		42	18	28.3	s
8.8		48	1	30.6	s	9.2		50	14	7.0		8.5		13	50	5.8		7.1		53	4	6.4	F	9.0		44	41	59.3	
9.5		51	8	9.9		9.5		51	20	12.7		9.5			59	45.6		8.5			27	21.0		9.5			55	34.2	
8.7			14	42.2	s	9.1		53	52	46.3		9.4		16	59	9.3		9.3			36	46.9		9.0		45	6	59.3	
9.2			18	5.0		9.5		54	24	5.8		9.4		17	27	43.5		9.3		54	58	41.7		8.5		49	36	37.8	
5.0		55	4	26.4	G	8.9		58	5	49.4		9.4			50	54.6		9.4	10	0	7	22.3		8.7		51	53	51.9	
9.5			21	21.3		9.5	6	4	31	10.4		9.5		21	26	14.9		9.5		2	10	40.5		8.8			54	33.1	
9.4		56	2	19.6		9.3			50	59.3		9.5		22	10	26.3		9.0			35	2.5		9.5	12	1	12	17.1	
9.2			36	27.0		9.3		13	28	34.4		9.3		24	8	17.3		6.8		5	21	31.6	F	9.5		2	0	14.5	
9.5		57	11	28.8		9.5		23	53	37.4		9.5		28	24	28.9		9.3		6	8	27.6		9.4		5	32	35.6	
9.5			18	0.9		9.5		27	35	24.1		9.5		29	12	33.1	n	9.1			22	18.2		9.5		13	15	3.8	
9.5		58	27	28.5		9.0		29	10	33.0		9.5		30	31	23.4		9.1		7	21	33.3		8.7		14	16	46.9	
8.7	4	1	6	49.5	s	9.5			32	23.6		9.5		32	5	31.1		8.6		8	7	55.8		9.5		16	12	20.2	
9.5		2	3	50.5		8.5			44	47.3		7.0		33	1	15.4	F	9.0			44	5.2		8.4		17	16	27.7	s
9.5		4	13	44.8	n	9.5		31	53	0.7		7.0		35	47	17.3	F	9.0			45	59.5		9.1		19	9	37.4	
7.4		10	58	43.0	F	9.5		33	46	21.3		9.5		36	30	3.0		9.5		11	21	14.3		8.6			39	28.2	s
9.5		13	7	37.3		9.5		35	29	17.7		9.5		38	42	16.9	n	9.5			32	23.2		9.3		21	27	1.0	
9.4		14	55	37.7		9.5			33	27.0		8.5		40	3	43.9	F	8.4		12	14	24.2	s	9.3		22	54	31.2	
9.5		16	43	35.0		9.0		37	11	12.2	F	9.5		43	59	20.9		5.2			57	17.5	B	9.4		29	10	21.8	B
8.9		17	43	27.2	s	8.9		39	53	11.5	F	9.0		45	3	41.6	s	9.1		16	42	50.6		9.1		33	29	23.1	
9.5		22	38	7.5		9.5		42	1	24.8		9.0		47	58	54.9		9.5			53	19.7		9.5		37	37	9.3	n
9.0		23	21	23.9		9.5			19	2.9	n	9.0		48	12	27.5		9.4		17	15	6.7		9.5		40	48	1.4	
8.5		24	11	1.6	F	9.0			49	4.0		9.5		54	12	43.4		9.3			23	9.0		9.5		41	9	40.7	
9.2		26	16	13.6		8.2		48	6	43.0	F	9.5			35	47.5		9.5			45	28.9	n	9.5			53	14.6	
8.8		27	57	27.5		9.5		53	28	48.1		8.3			53	12.3	F	9.0		22	21	39.1		9.3		43	48	9.6	
9.5		29	12	10.4	n	9.5		56	22	56.9		9.5		56	46	28.9		9.5		23	51	11.9		9.5		47	10	17.4	
9.3		31	34	46.8		9.5		58	27	36.0		8.6		58	43	30.3	s	9.5		26	38	0.8		8.6			12	13.2	s
8.5		32	11	13.9	s	9.5	7	5	52	11.9		9.5	9	0	29	19.0		8.6		32	25	57.8	s	8.5		48	22	18.4	s
9.1		35	26	8.8		9.5		9	8	40.2		9.5		1	8	34.9		9.5		34	37	10.7		9.1			48	27.3	
9.5		38	54	13.3	n	9.1		10	18	2.0		8.4		3	29	17.9	F	9.5		35	26	11.9		9.2		51	5	24.7	
9.0		39	22	19.1		9.4		11	40	48.3		9.5			37	58.3	n	9.5		36	45	4.8		7.5		52	46	18.2	s
9.0			25	59.8		9.5		14	40	8.4		9.1		5	7	44.3		9.5			45	15.7		9.5			46	49.9	n
9.5			51	20.0		8.0		15	34	23.1	F	9.3		6	9	33.8		9.4		37	17	57.4		9.5		57	50	31.6	
9.3		45	34	22.9		9.5		17	22	34.0		9.5			58	50.9		8.5		46	53	59.8	S	9.0		58	43	40.5	
9.5		49	3	59.6		9.4			40	17.4		9.2		7	27	50.9		9.5		47	50	39.7		8.3			51	43.0	S
9.5			30	20.5		9.2		18	3	53.0		9.5			45	29.9		9.5		48	55	40.6		9.4		59	47	9.3	
9.5			59	41.2		9.0		20	11	2.7		9.5			56	18.3		9.5		49	22	0.2		9.1	13	2	32	38.5	
9.5		51	12	22.5		9.4		21	54	13.4		7.2		12	28	33.3	F	9.5		50	0	58.8		9.4		4	16	8.1	B
8.7		53	50	39.4		9.5		22	4	55.6		9.4			29	27.6		9.5			13	39.2		9.4		10	44	0.0	
9.0		54	11	48.6		9.5			8	14.0		9.5			34	21.2		8.2		54	13	31.5	F	9.5			45	10.2	n
9.0		58	20	15.0	S	9.2			46	21.9		8.9		14	37	3.9		8.8		55	7	52.8	S	8.9		11	47	22.1	
9.5		59	18	16.1		9.5		25	33	20.3		9.5		15	20	35.4	n	9.5		57	6	2.8		8.7		12	1	0.1	
7.1	5	0	36	43.1	F	9.4		32	9	12.9		9.1		16	46	34.3		9.0			43	13.9		9.2			24	25.6	
9.0		4	21	13.3		9.5			44	26.7		7.5		19	2	0.4	F	9.5	11	0	32	24.2		9.5			34	51.0	
9.5		5	10	35.7	n	9.4		33	37	15.9		8.0		24	33	59.1	F	9.0		5	8	29.0		9.0		15	36	2.7	
9.2			55	0.7		9.5		35	19	2.3		9.5		28	24	37.5		9.1			31	24.2		9.1		17	9	37.4	
9.3		8	50	18.3		9.5		36	27	49.9		9.5			39	13.1		9.1		8	35	6.4		9.3			14	41.8	
9.5		12	53	9.2		9.5		47	10	19.9		8.8		30	5	19.5		9.5			45	23.3		9.4		25	44	53.6	
9.5		13	48	44.4	n	8.2		53	42	31.9	F	9.5		31	46	5.5		9.5		10	35	36.9		9.3		30	49	10.7	
9.3		18	54	12.2		9.5		55	25	10.1		8.8		32	58	30.9		9.4		11	33	4.9		9.5		31	39	37.7	
8.7		19	15	31.9	s	9.5			55	50.3		9.5		35	19	32.9		9.5		12	26	39.4		9.4		32	8	11.3	
9.5			16	20.0		9.4		56	4	11.8		8.5		36	19	13.2		9.5		18	34	30.4	n	9.1			53	14.4	

391—450

	13u—15u	+83°	
m	u ′ ″	′	
9.4	13 33 41	51.7	n
9.5	37 41	25.9	n
9.5	40 39	57.5	
9.1	41 50	22.1	
9.5	42 9	41.6	
9.2	44 12	28.6	
6.5	46 42	28.8	G
9.5	50 51	14.8	
9.4	54 28	1.5	
9.5	55 52	35.4	
9.5	55	37.5	
9.2	58 23	39.4	G
9.5	49	18.8	n
9.5	14 4 2	3.8	
9.4	33	3.8	
9.5	6 22	3.7	
9.5	9 25	40.0	
8.9	11 55	58.3	
9.5	15 0	24.8	
9.5	39	16.9	
9.4	19 56	3.1	
9.5	21 58	7.8	
9.5	24 35	15.0	
9.5	25 54	59.6	
8.5	29 37	23.5	s
9.4	35 22	6.8	
8.7	55	11.6	
9.5	37 47	2.8	
9.3	40 55	46.0	
9.1	41 16	34.8	
9.5	56	30.4	
9.4	43 9	46.7	
8.5	46 1	4.9	G
9.5	47 40	12.7	
9.3	48 6	44.0	
9.0	59	4.4	s
9.2	49 8	50.2	
9.1	50 59	30.6	
9.0	51 24	21.0	
9.5	54 56	34.4	
6.0	15 0 27	6.2	s
9.5	3 7	31.6	n
9.2	5 54	56.8	
9.5	7 48	47.3	
9.3	10 21	1.4	
9.1	11 44	32.7	
8.8	46	45.0	s
9.3	12 44	53.9	
9.0	59	53.0	s
8.5	15 47	22.3	s
8.8	17 4	58.2	s
9.5	19 7	17.7	
9.5	22 6	18.9	
9.5	25 53	27.7	
9.2	35 1	35.1	
9.5	41 21	13.0	n
8.8	50 33	16.3	s
9.5	51 42	33.0	
8.9	52 13	40.9	
9.3	19	40.3	

451—510

	15u—17u	+83°	
m	u ′ ″	′	
9.5	15 53 31	9.2	
8.4	58 4	43.3	
7.3	48	22.7	G
9.5	59 47	18.9	
9.5	16 4 8	42.0	
8.5	24	41.4	s
8.5	53	13.1	s
9.5	5 10	56.7	
9.5	6 31	36.9	
9.4	7 47	14.9	
9.4	8 30	30.6	
9.5	9 14	57.7	
9.1	10 16	28.8	
9.0	41	5.7	s
9.5	11 16	44.2	
9.5	12 55	38.8	
9.4	15 43	44.6	
8.2	18 6	46.8	F
9.5	22	37.6	n
9.5	19 35	51.6	
9.5	21 25	46.9	
9.5	23 59	47.2	
9.5	24 8	22.5	
9.5	25 36	19.8	
9.1	27 20	42.6	
9.5	31 48	16.5	
9.5	32 12	43.9	n
9.4	31	43.1	
9.5	38 38	35.5	
9.5	39 28	52.3	n
9.5	42 33	34.9	
9.3	44 18	53.8	
9.5	26	28.4	
9.5	48 54	2.6	
9.5	49 7	28.5	n
9.0	51 40	38.7	
9.5	52 22	53.6	
9.5	25	38.7	n
9.3	53 39	13.8	
9.5	55 15	58.6	
9.4	17 0 35	52.9	
9.3	3 30	54.6	
9.0	4 21	24.7	s
9.5	6 10	34.8	
9.3	9 6	23.8	
9.5	10 51	55.2	
9.3	12 45	22.8	
9.2	54	29.3	
9.5	14 35	45.4	n
9.4	15 2	42.0	
8.8	21 35	22.5	s
9.5	22 3	9.4	
9.5	26 32	35.7	
9.5	27 57	32.8	
8.7	33 31	26.9	s
9.0	34 7	9.1	
9.0	13	23.2	
9.5	23	43.8	
9.5	36	59.0	
9.2	50	3.5	

511—570

	17u—20u	+83°	
m	u ′ ″	′	
8.3	17 38 34	48.8	F
7.5	58	26.5	G
9.5	40 44	16.1	
9.5	43 48	22.0	
9.4	48 50	27.4	
9.5	51 38	39.6	
9.5	53 55	48.5	
9.5	56 3	56.7	
9.5	30	32.3	
9.5	59	17.8	
9.2	18 1 19	39.1	
9.5	2 12	9.2	
9.2	7 27	40.4	
8.8	8 29	26.0	G
9.5	10 2	12.5	
9.5	11 8	1.8	
7.7	15 48	53.5	F
9.1	20 2	24.2	
9.5	22 47	10.1	
7.8	28 8	37.4	s
8.2	30 59	10.6	s
9.0	32 24	30.9	
8.8	35 11	57.9	s
8.5	36 37	43.9	s
7.4	42 31	15.2	G
6.2	43 11	3.5	G
9.5	48 17	49.0	
9.5	25	32.4	
9.2	55 29	5.6	
9.5	57 57	22.7	
8.8	58 59	8.3	s
8.8	19 0 10	28.6	
9.3	59	57.6	
8.8	2 2	21.2	
9.5	4 57	30.4	
9.5	8 46	18.7	
6.5	10 27	41.9	F
9.5	14 31	30.6	
9.5	21 53	35.7	
9.3	24 10	34.9	
9.5	32 2	19.5	
6.0	33 25	10.3	F
9.5	55	25.0	
9.0	35 37	30.2	
9.4	39 53	56.9	
8.7	40 29	58.8	s
9.4	45 55	3.2	
9.5	49 22	16.3	
9.0	50 56	26.0	
9.5	53 52	5.6	
9.3	54 55	53.4	
9.5	56 1	42.2	
9.4	57 9	31.9	
9.5	58 28	30.0	
9.5	20 0 6	1.5	
9.5	1 56	56.2	
9.4	6 42	28.2	
9.5	9 8	49.6	
9.0	12 3	50.9	
9.4	19 2	3.1	

571—630

	20u—22u	+83°	
m	u ′ ″	′	
9.3	20 22 49	44.4	
8.5	23 42	44.7	
9.3	46	8.3	
9.5	28 25	22.6	
9.5	30 2	6.6	
9.5	51	28.3	
9.4	31 7	30.7	
9.5	10	55.2	
9.5	59	23.6	
9.0	59	40.9	
9.2	33 47	48.5	
9.4	36 20	30.1	
9.4	20	38.6	
9.4	33	37.4	
9.5	58	45.9	
9.3	37 13	4.5	
9.4	38 35	8.6	
6.2	43 11	7.1	F
9.5	34	0.1	
9.5	45 12	6.8	
9.3	17	29.0	
9.5	50 53	51.0	
9.4	56 36	9.0	
8.8	57 43	11.2	F
9.5	59 7	46.2	
7.7	21 2 49	22.6	F
9.5	7 1	3.2	
9.4	9 1	40.2	
9.5	36	32.2	
9.5	10 46	48.9	n
9.2	12 54	32.3	
9.5	20 43	16.8	
7.5	25 0	38.6	G
9.5	27 23	45.0	
9.4	58	57.9	
9.4	28 3	51.7	
9.5	30 18	27.2	
9.0	38	59.7	
9.3	32 20	35.4	
9.5	33 15	37.3	
9.5	35	59.6	
9.5	34 45	38.7	n
8.6	38 5	12.0	F
8.4	42 9	17.7	F
9.1	45 29	40.2	
8.8	48 27	38.7	F
8.9	49 49	39.6	F
7.2	52 42	21.5	F
9.5	56 33	31.1	
9.0	57 36	21.0	F
9.3	22 4 8	33.1	
9.0	5 55	38.4	
9.5	57	50.9	
9.5	6 15	22.8	
9.3	11 16	2.9	
9.0	13 50	21.9	
9.2	15 31	4.3	
9.5	16 26	53.8	
9.5	17 23	56.3	
7.0	22 30	46.4	s

631—675

	22u—23u	+83°	
m	u ′ ″	′	
9.5	22 26 17	39.6	
9.5	30 10	50.2	
9.3	36 23	15.9	
9.4	40 3	36.2	
9.3	41 13	33.3	
9.5	44 24	2.6	
9.3	47 54	49.1	
9.5	53 16	59.7	n
9.5	55 12	24.7	
5.0	23	34.2	G
9.5	57 56	10.9	
9.5	23 1 40	53.4	n
9.5	5 30	8.6	
9.5	9 41	11.8	
9.5	11 43	21.0	
9.5	12 28	33.8	
8.0	41	27.1	F
9.2	14 23	44.5	
9.3	17 28	53.9	
9.5	19 47	19.2	
9.5	20 38	40.7	
9.5	21 1	32.9	
9.5	22 55	19.9	
9.5	23 50	17.5	
9.3	24 54	7.7	
9.4	25 14	25.6	
9.3	59	44.9	s
9.5	26 32	0.1	n
9.5	39	14.4	
9.0	31 51	20.9	
9.5	32 42	42.0	
9.5	39 7	23.1	
9.1	40 51	14.9	
9.5	43 50	16.5	
9.5	44 43	41.1	
9.3	46 52	21.3	
9.5	48 48	58.8	n
9.4	50 7	0.2	
9.3	40	45.6	
9.5	51 19	21.7	
9.5	52 11	12.2	
9.5	54 34	4.4	
9.4	56 51	40.0	
9.5	59 28	36.8	
9.5	48	47.8	

Zone +84°

1—10

	0u	+84°	
m	u ′ ″	′	
9.5	0 1 43	40.1	n
9.5	4 15	9.5	
8.0	7 45	9.0	F
9.2	9 2	22.9	
9.5	11 48	51.8	
9.5	15 48	50.8	
9.5	19 51	13.5	
9.5	22 46	14.7	
9.0	23 16	11.3	s
8.5	25 18	17.6	s

11—70								71—130								131—190								191—250								251—310							
	0u—3u			+84°					3u—6u			+84°					6u—8u			+84°					8u—10u			+84°					10u—13u			+84°			
m	u	′	″	′				m	u	′	″	′				m	u	′	″	′				m	u	′	″	′				m	u	′	″	′			
9.5	0	29	0	33.0				9.5	3	29	55	20.0				9.5	6	15	6	42.7				9.3	8	32	52	48.2				9.4	10	59	40	34.8			
9.4			36	26.4				9.0			59	44.6				9.5			22	48.0				9.5		35	54	31.2				8.4	11	6	32	8.5	F		
9.0		33	52	15.3				9.5		30	44	49.8				9.5		16	58	22.1				9.3		38	23	34.4				9.5		8	22	8.8			
8.6		39	45	54.8	s			9.5		32	41	36.1				9.5		17	51	56.7				9.5		42	43	59.4				9.5		17	48	18.4			
8.2		40	52	40.2	s			9.5		38	26	51.4				8.2		20	53	48.4	s			9.5		43	54	20.4	n			8.8		20	29	48.2			
9.1		41	18	30.8				9.4		42	38	56.4				9.5		21	54	53.8				6.0		44	18	45.1	F			8.6		22	23	28.7			
9.5		49	37	46.1				9.5		56	49	13.7				9.5		24	35	20.5	n			9.3			43	14.1				9.5		31	56	22.8			
8.8		58	15	19.3				7.5		58	4	7.2	F			9.5		25	0	25.5				9.5		46	3	53.0				9.0		32	44	35.3			
9.0	1	2	54	21.8				9.2		59	0	10.6				9.5		26	0	7.7				8.6		47	9	12.7	s			9.5		33	55	59.1			
9.4		4	57	6.5				9.5	4	2	0	38.1				9.5		28	2	8.3				9.3		50	12	6.9				8.4		34	42	14.1	G		
9.5		5	52	45.8				9.4		5	50	37.1				9.4		32	8	6.0				9.4		53	18	25.4				9.4		37	37	53.8			
9.5		7	42	50.6				9.4		6	7	52.5				9.5			34	4.8				9.4			21	54.6				8.4		55	31	11.4	G		
8.8		11	53	38.1				9.1		7	28	41.4				9.4			59	52.1				9.3	9	0	49	8.3				9.5		57	22	14.5			
9.2		12	19	55.8				9.5		11	41	39.6	n			9.5		34	30	11.2				9.3		2	9	33.2	B			9.5	12	0	9	43.0			
9.3		21	19	28.4				9.0		12	48	19.3				9.3		36	58	17.6				9.5			26	9.6	n			9.5		2	7	7.5			
9.4		23	50	12.2	s			9.5		15	16	23.9				9.4		38	48	15.0				8.0		5	51	21.6	B			9.5		3	4	5.2			
9.4		24	16	44.1				9.0		20	52	59.9				9.4		44	56	44.6				9.5		8	12	43.5	n			9.5			46	3.9			
9.4		26	4	58.4				7.7		21	14	36.0	F			9.5		53	58	16.2				9.5			15	41.0				9.2		6	47	6.4			
8.0		27	29	28.9	s			9.5		30	32	14.1				9.3			59	31.7				9.5			48	8.7				7.5			49	18.6	G		
9.0		28	33	19.6	s			9.1		31	18	40.6				9.5		55	35	34.9				9.3		11	52	10.7				9.5		7	33	3.0			
9.5		29	11	34.1				9.5		32	37	8.5				9.5		56	29	47.5				9.5		12	23	2.1				9.4		8	53	54.7			
8.9		34	22	25.4	s			9.5		34	18	9.9				8.0	7	1	34	28.6	F			8.5		15	9	28.6	s			9.5		9	30	37.9	n		
9.5		38	40	30.9				8.5			49	58.1	s			9.3		3	16	48.0				8.3		22	13	26.7	s			9.0		13	4	1.2			
8.1		39	10	1.5	R			9.2		40	9	6.5				9.4		12	7	6.8				9.5			16	49.5				7.2		14	53	10.8	G		
9.1		41	15	11.1				9.5			35	18.7				9.5		14	42	53.7				8.8			32	59.9				8.5		18	1	27.5	G		
9.4		52	6	33.5				9.5		43	44	7.3				9.0		15	7	48.1				8.7		23	0	23.7	s			7.9		19	17	14.0	G		
9.2		59	32	7.0	s			8.8		45	32	40.9	s			9.4			51	30.2				8.7			47	22.2	s			9.5			17	50.3			
9.1	2	0	56	30.5				9.5			54	6.7				9.4		17	35	6.8				8.3		25	12	10.0	F			9.5			39	42.8			
9.5		2	4	33.6				9.5		48	35	22.4				9.3			42	47.2				9.5			15	8.7				8.7		22	10	40.7			
9.0			8	23.6	s			9.5			46	15.7				9.5		20	45	9.9				9.3		27	7	50.0				9.5			54	44.4	n		
9.5		3	51	30.3				9.5		56	25	22.0	n			9.3		25	45	17.2				9.5		29	50	26.8				9.4		29	31	15.3			
8.5		11	26	24.7	s			9.5		57	11	11.3				9.5		26	7	19.7				8.0		36	30	9.5	s			9.4		33	40	2.7			
9.2		13	51	39.0				9.5			46	55.8				9.0		28	40	16.9	s			8.8		39	57	18.7				9.3		35	25	16.2			
9.3		15	54	54.2				9.2		59	5	4.4				9.5		29	7	8.7				9.2		42	17	35.5				9.1			29	25.7			
9.0		28	37	33.9				9.5	5	3	4	17.9	n			9.5			8	41.7	n			6.5		44	40	36.7	F			9.4		36	47	22.4			
9.3		31	24	2.5				8.9		4	42	11.0				9.3			58	15.4				9.4		45	11	48.8				7.0		37	14	26.4	G		
9.5		32	22	3.9				9.5		13	18	2.4				9.4		30	0	30.2				9.4		47	30	12.5				9.4			14	38.7			
9.2		36	41	2.5				9.5		16	38	2.9				7.8		33	37	47.3	F			9.5		55	57	23.6				9.5		43	48	14.7			
9.4		41	50	1.7				9.5		20	14	2.3				6.0		41	37	27.7	G			9.3		56	51	4.7				6.5		47	59	12.4	G		
9.5		46	28	17.1				9.0		23	23	46.9	s			9.3		42	5	42.6				9.5	10	2	48	14.2	n			5.5		48	7	12.1	S		
8.7			42	16.5	F			9.5		27	50	54.7				9.3			52	25.3				9.5		5	48	54.2				8.8		53	11	0.4			
9.5		47	58	53.3				9.0		29	59	57.2	s			9.5		50	22	21.5				9.4		7	3	53.0				9.4			32	33.2			
8.5		48	13	25.0	F			9.4		33	13	20.5				8.8			41	26.6	F			9.4			27	43.0				9.3		56	27	5.7			
9.5		50	53	24.6				8.9		34	22	4.5	s			9.2		53	36	35.0				5.0			49	59.1	G			9.5	13	0	27	33.1			
9.5		52	9	25.5				9.5		35	42	29.9				9.2		54	12	34.8				9.4		8	44	37.2				9.5		2	9	28.1			
9.5		53	33	7.3				9.5		36	4	1.9				9.5		55	10	43.2				9.1		9	28	12.3				8.6		5	6	24.5	s		
9.1		58	6	37.7				9.0		37	13	6.5	s			9.4		57	29	40.5				8.5		10	4	17.4	s			9.4			10	30.7			
9.4			33	55.4				8.8		41	39	11.1	S			8.9	8	3	2	40.7				9.5		22	3	17.8				9.5		6	10	46.5			
6.0			48	23.1	G			9.5		46	31	57.8	n			8.3			48	54.7	s			9.2		24	32	50.1				9.5		8	17	19.6			
9.5		59	24	46.7	n			9.3		47	26	48.8				9.5			9	56	23.1			9.5			49	10.1				9.3		9	12	3.4			
9.0			26	5.1				9.5		49	3	49.3	n			9.5		10	54	33.8				9.1		29	51	13.7				8.8		10	36	26.2	s		
9.3	3	4	57	24.4				9.5		55	23	23.3				9.5		12	14	46.3				9.5		30	19	35.7				8.7		11	52	8.9			
9.5		11	57	42.4				9.5		57	12	33.2				9.2			38	36.4				9.2		32	50	16.3				9.0		12	31	56.8			
9.5		17	56	9.8	n			9.5		58	19	21.2				9.5		14	17	43.3	n			9.3		42	23	12.8				9.5		17	25	25.5			
8.9		18	54	47.0				9.4	6	0	4	0.9				9.5			42	44.0	n			9.5		47	40	58.6				8.5		18	37	40.1	s		
8.4		21	34	21.2				9.5			13	24.9				8.0		25	5	24.8	F			9.4		48	1	30.8				9.5		19	58	21.7			
9.5		22	39	22.6	n			9.5			15	35.0				9.2			38	4.2				9.5		49	27	17.9	n			8.0		21	53	39.5	F		
9.0		24	47	0.4	s			9.5		9	50	39.3				9.5			48	34.2				9.5		53	58	40.5	n			9.2		22	28	10.2			
8.8		28	8	13.1	s			9.5		10	8	32.0				9.4		27	42	28.9				9.3		55	9	33.5				8.8		24	7	14.2			
9.5			59	14.7				9.5		13	12	22.7				9.5		32	41	54.8				9.3		57	24	16.6				8.5		27	11	12.9			

+84° & +85°

311—370

	13u—17u			+84°	
m	u	′	″	′	
7.5	13	27	55	3.4	F
9.5		28	2	13.2	
9.5		34	37	2.2	n
9.5		36	15	0.8	n
9.4		40	36	44.9	
9.5		46	48	9.1	
8.8		55	29	49.8	
9.4		57	18	41.6	
9.4		59	33	27.5	n
9.5	14	0	9	46.7	
9.0		13	19	8.3	
8.0		25	24	36.4	s
var		28	54	29.2	B
9.0		34	41	43.4	
9.5			56	26.6	
8.6		36	34	21.9	
8.5		40	8	5.4	s
8.6			8	6.7	
9.0		46	42	55.7	
9.4		47	1	12.0	
9.5		49	40	37.4	
9.5		50	30	24.8	
9.1		51	12	28.7	
9.1			42	59.8	
7.5	15	6	47	30.7	G
9.5		8	28	25.5	
9.5		10	5	45.8	
9.5		11	41	5.0	
8.4		12	35	35.2	s
9.5			49	19.3	n
9.5		13	11	5.3	
8.9			37	29.8	
9.1		27	24	28.4	
9.3		28	51	2.5	
8.3		35	5	21.7	F
9.0		39	22	25.5	
9.3		43	0	19.4	
8.8		46	36	58.8	s
9.5		52	34	44.8	
9.5	16	0	31	22.8	
7.7		7	1	1.8	F
8.4			45	59.5	s
9.5		9	38	0.4	
9.3		11	10	18.1	
9.5		20	34	36.9	
9.5		24	44	43.8	
9.3		25	13	22.7	
9.2		32	21	37.9	
8.7		35	54	7.3	s
8.5		38	10	52.5	s
7.2		40	11	0.4	F
9.5		42	1	30.8	
9.5		46	1	27.6	
9.5		47	22	3.2	
8.5			38	16.9	s
9.3			51	16.2	
9.5		48	33	36.4	
9.5		54	38	44.1	
9.3		58	19	28.3	
9.0	17	5	29	41.5	s

371—430

	17u—19u			+84°	
m	u	′	″	′	
8.5	17	7	20	53.7	F
9.5			38	58.2	
9.4		11	17	41.7	
9.4		13	22	23.4	
9.5		14	9	42.0	
9.5		15	47	23.9	n
9.3		20	19	25.9	
8.2		21	4	56.8	F
9.5		25	50	30.0	
9.5		30	26	6.3	
9.5		32	28	32.5	
9.5			41	6.6	
7.7		37	3	43.7	F
9.5		41	18	15.6	
8.8		42	0	29.2	
9.5		43	5	10.8	
8.6		47	48	1.2	s
9.5		50	19	48.0	
8.7		53	10	49.4	s
9.5		55	13	16.3	
8.9		56	49	16.8	s
9.5		58	0	32.0	
9.2			19	18.8	
9.4	18	0	3	10.9	
9.4			42	21.0	
9.5		1	22	38.7	
9.4		2	34	4.6	s
9.3			50	4.2	
9.2		5	6	54.7	s
9.2		10	22	39.7	
9.5		12	9	35.4	
9.5			49	33.8	n
9.5		14	3	53.5	
9.0			50	41.9	F
8.4		15	13	23.6	s
8.2			44	39.1	
9.3		19	5	1.9	
9.2		20	0	36.7	
9.0		28	3	32.9	
8.5			56	19.2	s
9.5		29	10	48.6	
7.5		32	47	35.2	F
8.5		39	49	11.5	s
9.4		41	31	27.0	
8.5		42	17	30.6	s
8.8		43	48	10.6	s
9.5		44	1	5.1	
9.5		48	0	12.0	
9.5		49	31	5.8	
9.1		52	1	22.1	
9.4		54	32	6.2	
9.4			58	8.6	
8.6		55	15	28.7	s
9.2		57	11	2.9	
9.3	19	2	33	43.4	
9.2		8	36	20.9	s
9.4		9	21	6.3	
9.5			29	43.7	
9.5		12	52	7.5	
9.5		14	21	39.9	

431—490

	19u—21u			+84°	
m	u	′	″	′	
9.0	19	22	13	59.5	
9.4		25	14	57.3	
9.2			17	58.8	
9.5			41	28.6	
9.5		26	40	43.8	n
9.2		28	32	20.3	s
9.0		32	59	30.0	s
9.3		34	36	8.7	
9.5		46	7	29.7	
9.5		49	24	14.9	
9.4		50	7	14.0	
9.5		51	33	8.0	
9.5			49	22.3	
9.4	20	0	22	11.5	
8.5			30	24.1	s
8.5		3	22	20.8	s
9.5		8	9	31.1	
8.8		11	45	18.0	
9.4		17	53	52.1	
9.5		19	38	29.4	
7.0		20	0	14.2	G
9.4		21	28	34.9	
9.5		22	16	42.6	n
9.4			31	37.0	
9.0			41	54.7	
9.5		23	7	23.9	
9.1			33	43.6	
9.5		27	14	45.5	
9.5		28	34	45.0	n
9.5			34	14.8	
8.5		29	12	37.9	F
7.0			59	4.7	G
7.2		30	57	39.7	F
9.5		34	33	43.2	
9.5		36	3	11.4	
9.5		39	14	30.3	
9.5		40	51	53.3	
9.5		44	52	3.0	
9.4		45	18	7.3	
9.3		52	5	16.1	
9.5		53	10	47.0	
9.5		55	19	38.0	
9.3		56	25	57.8	
8.4		58	9	4.2	s
9.5		59	20	33.1	n
9.5			59	40.9	
9.3	21	7	8	38.9	
9.5		8	23	5.2	
9.3		13	42	42.2	
9.5		19	46	12.0	
9.4		20	12	54.7	
9.5			54	50.4	
9.3		23	46	14.4	
9.5		25	1	36.8	
9.4		28	28	1.2	
9.3		31	45	21.7	
9.4		34	6	28.3	
9.5			48	12.9	
9.4		35	0	58.9	
9.4		36	39	51.6	

491—547

	21u—23u			+84°	
m	u	′	″	′	
9.5	21	38	14	16.7	
9.5		40	4	33.2	
9.4		42	40	30.8	
9.5		50	1	11.3	
9.3			11	23.4	
9.5		54	47	31.8	
9.5			52	14.4	
9.5		56	0	42.2	
9.3	22	1	55	24.6	
9.0		2	11	7.3	
9.2		5	12	29.4	
9.5		6	46	7.0	
9.5		9	16	3.9	
9.5		10	52	34.5	n
8.0		16	13	41.3	F
9.5		17	36	33.2	
9.2		20	8	1.9	
9.3		27	39	16.1	
7.2		29	11	19.3	F
9.2		31	15	59.8	
9.5		39	26	27.7	
9.5		42	53	50.5	
7.3		50	40	0.4	P
9.5		53	15	42.6	
9.5			22	46.3	
8.0		54	4	16.4	F
6.5			15	35.8	F
9.5			40	38.9	
9.4		57	7	21.2	
9.5			9	9.6	
9.5			50	10.1	
9.4	23	6	35	47.6	
8.4		7	36	56.7	s
9.5		8	23	7.1	
9.5		9	4	29.9	
9.5		11	1	10.5	
9.3			6	31.1	
9.4			6	12.1	
9.5		15	36	40.4	
9.5		17	8	29.3	
9.5		20	24	59.6	
9.5		29	17	33.5	
8.7		32	50	21.9	F
9.4		36	17	0.7	
9.0		37	4	16.2	
8.2		38	9	39.1	s
9.5			10	56.8	
9.0		39	42	31.2	
8.1		42	29	16.4	s
9.5		43	16	43.8	
9.5		48	15	9.9	
9.4		54	22	31.7	
9.2		56	37	26.5	
9.5		58	31	41.0	n
9.5			32	50.4	
8.2		59	8	35.8	s
9.4			52	57.3	

Zone +85°

1—50

	0u—2u			+85°	
m	u	′	″	′	
9.5	0	1	33	13.0	
8.9		5	52	55.2	s
8.8		6	34	51.9	s
9.5		8	4	26.5	n
9.5		14	26	7.8	
9.5			52	13.8	
9.5		18	1	12.0	
9.3		22	25	18.5	
8.3			29	31.1	G
9.0			48	54.5	s
8.8		25	27	10.2	s
9.3		27	22	35.8	s
9.4		28	5	28.0	
9.5		30	19	7.3	
9.5			58	41.7	
9.5		33	12	40.8	
9.5		43	7	2.7	
9.4		46	50	27.7	
5.0		49	43	28.6	G
8.9		50	38	1.0	
9.4			39	39.9	
9.5		54	14	59.9	
9.5		56	26	37.4	
9.4	1	0	54	39.3	
9.5		3	33	9.4	
9.5		7	30	23.6	n
9.5		9	6	26.5	n
9.5		16	9	21.4	
9.5		17	17	59.6	
9.4		22	52	57.8	
9.4		24	45	3.3	
9.0			51	31.8	R
9.5		28	19	12.3	
9.5			41	53.2	
9.2		31	35	20.6	
9.1		36	23	1.6	
9.5		37	46	30.2	
9.0		40	45	45.4	
9.5			56	7.1	
9.5		42	51	10.2	
7.7		50	50	2.5	s
9.5		53	39	41.1	
9.5	2	11	38	13.2	n
9.5			47	11.4	n
8.6		14	9	9.6	L
8.9		22	1	37.8	
9.5		23	23	51.4	
8.8		29	27	15.2	s
9.5		30	39	38.3	
8.8			54	15.8	s

51—110						111—170						171—230						231—290						291—350					
	2u—7u			+85°			7u—10u			+85°			10u—13u			+85°			13u—18u			+85°			18u—20u			+85°	
m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′		m	u	′	″	′	
9.5	2	35	47	39.1		8.5	7	12	42	32.8		9.5	10	43	29	2.4		9.3	13	44	1	29.1		9.5	18	8	7	52.0	n
9.4		51	8	6.8		9.5		13	8	58.0		9.2			49	32.7		9.3		46	22	13.0		9.5		10	14	7.7	
8.8		52	16	51.8		9.5			31	25.6		8.9		45	52	59.7		8.5			24	59.2	F	9.5		12	28	2.2	
9.2		53	43	11.2		9.5		14	15	48.5		9.5		56	51	23.3		7.0		54	46	13.8	F	7.5		18	6	40.1	F
9.5	3	4	59	22.2		9.0		15	1	54.5		9.5		59	30	44.7		8.8	14	0	47	54.5	F	9.5		19	11	20.1	n
9.4		8	56	46.7		9.5		22	0	15.7	n	9.4	11	0	7	18.8		9.5		14	41	3.8		9.5		20	40	15.6	
8.5		26	27	10.6	s	8.9		28	46	1.7	F	9.5		1	24	52.7		9.4			50	0.4		9.4		21	22	5.4	
9.5		38	35	16.7	n	9.4		31	12	8.0		9.5		2	31	7.9		9.2		22	23	21.5		9.5			31	31.0	n
9.3			56	39.3		9.5		36	49	26.3	n	9.5			42	48.4		8.5		26	41	13.5	s	9.5		22	28	32.8	n
9.5		46	46	34.3	n	9.5			54	7.3	n	9.5		7	1	16.2		9.0		32	31	58.0		9.5		25	37	29.9	
9.5		47	12	33.5	n	9.5		39	55	20.5	n	9.5		10	38	0.5		9.1		33	18	26.6		9.5		28	56	51.5	
9.0		51	14	30.4		9.5		45	42	32.5		9.4			47	44.2		8.0		44	38	54.2	s	9.5		35	26	34.6	
6.5		52	25	9.9	G	9.5		50	44	44.7	n	7.5		20	2	30.3	F	9.5		45	12	59.8		9.5			37	26.1	
9.0	4	4	36	7.6		8.8		55	5	41.5		9.3		23	9	25.5		9.4		48	5	33.1		8.7		37	47	23.8	
8.5		7	50	22.1	s	9.0		56	17	15.2		9.5		24	23	43.1		9.2		49	12	25.3		9.5		38	2	53.0	n
9.5		11	23	41.9		9.4		58	40	15.0		9.5		27	37	33.8		9.5			13	10.9		9.4			46	28.2	
9.5		18	20	22.7		9.0	8	9	4	11.2		9.5		29	39	52.8		8.5		53	17	28.5	s	9.3		39	43	13.0	
9.5		19	8	53.7		7.5		12	41	33.2	G	9.5			40	3.5		8.6	15	3	11	53.1	s	9.5		41	37	0.6	
9.4		20	11	54.2		8.2		14	37	41.6	F	9.3		31	2	4.5		8.0		16	37	40.8	F	9.4		45	14	0.3	
9.5		33	11	49.0		9.5		17	21	18.9		9.0		41	23	36.1	s	9.4		17	41	35.9		9.5		46	17	4.1	
9.5		36	21	52.4		9.0		26	43	18.6		8.4			42	48.1	s	9.2			58	36.9	s	9.5			48	33.9	
9.4			28	52.7		8.2		36	56	15.3	s	9.1		51	41	51.4	s	9.3		19	33	13.0		9.5		49	43	26.9	
9.5		39	3	53.4		9.5		37	12	30.5		9.4		53	25	1.6		9.5		23	46	50.9		9.5		51	10	22.1	
6.0		41	0	45.2	F	9.5			27	23.2		9.5			32	47.4		9.4		25	25	4.9		9.5		52	49	37.7	
8.5		45	8	32.3	s	9.0		42	34	2.9		9.5		57	4	17.5		9.5			42	31.6	n	9.4		58	41	34.8	
9.5		50	54	16.9	n	9.3		43	59	7.2		8.2	12	4	35	53.2	s	9.3		29	44	28.6		9.5		59	26	45.1	
9.0		52	20	5.8		9.5		45	50	27.4		8.9			42	44.8		9.0		33	40	16.5		9.5			55	4.5	
7.0		55	5	31.5	F	9.5		49	21	59.4		9.4		10	32	13.2		9.5		36	26	22.4		9.4	19	0	52	54.1	
9.3	5	10	18	56.0		9.5		51	48	25.0	n	8.5		12	15	5.9		9.5		42	55	30.2	n	9.5		9	9	21.2	
6.0		15	59	6.4	G	9.5		52	51	25.0		9.5		17	49	45.7		9.5		46	25	26.1		8.9		10	22	25.1	s
8.0		20	24	13.6	G	9.5		54	40	11.2		9.3		18	30	37.7		9.4			26	1.3		9.4		12	3	54.5	
8.9		24	0	34.4		8.5		57	3	48.6	s	9.0		31	35	28.8		9.5		49	57	19.2		9.5		15	59	6.1	
9.2			40	56.0		9.5		58	7	19.9	n	9.2		34	28	32.0		7.2		50	15	17.7	F	9.5		19	14	7.4	
9.3		28	4	0.8	s	9.5		59	12	34.8	n	9.5		35	15	53.1		8.9			34	9.7	s	9.0		20	20	23.6	
9.3		32	31	15.3		9.5	9	1	6	26.5		9.4		36	17	29.3		8.8		55	10	21.2	s	9.1		21	37	38.5	
9.5			47	41.2		9.5		5	2	2.4		9.5		38	56	54.7		8.8		58	41	41.3	s	9.5		30	9	29.6	
9.0		33	35	6.2		8.5		8	32	43.4	F	9.4		39	55	39.4		9.5	16	4	1	18.8		9.5		36	47	34.1	
9.5		43	12	58.0		9.4		12	0	53.0		9.5		46	4	3.5		9.5			39	49.5		9.5		38	0	3.4	
9.5			20	18.8		9.5		23	48	19.8		8.5		53	39	29.2		7.5		6	35	42.7	F	8.4		44	3	46.7	s
9.5		46	40	35.5	n	8.0		25	24	8.6	F	8.9			59	15.8		9.5		9	8	39.6		8.9		45	48	46.4	s
9.1		50	3	23.8		8.5		28	23	2.7	s	8.7		55	53	54.9		9.5		26	36	22.5		9.1		49	58	49.2	
9.3		54	25	13.6		9.5		32	34	34.1		9.5		56	14	51.2		9.5		36	45	24.3		9.2		51	53	1.8	
9.4		58	18	5.7		9.5		37	44	19.6	n	8.5	13	1	21	21.9		9.5		45	52	42.1		9.5	20	2	22	14.5	
8.9	6	1	18	6.7		8.9		51	19	9.0		8.6			59	2.2		9.4		48	9	9.2		9.4		3	14	20.6	
9.4		12	15	29.8		8.7		54	43	59.7		9.3		3	9	16.6		9.3		56	34	34.8		9.2		6	30	40.9	
9.5		14	13	16.6		9.5		57	25	9.2		9.5		5	6	2.0		9.5		59	5	56.9		9.3		9	29	26.1	
9.5		19	3	31.9	n	9.1	10	1	23	35.0		9.0		14	34	57.0		9.5			10	47.1		8.5		11	40	28.2	s
8.6		20	33	43.7	s	9.0		2	29	37.6		9.5		16	32	33.4		8.7	17	0	28	52.8	s	9.3		12	53	29.1	
9.0		22	31	2.8		9.4		6	14	26.9		9.3		17	13	6.4		9.3		9	39	2.0		8.7		16	11	38.2	
9.1		24	20	1.3		8.5		11	31	58.1	s	9.0		20	0	50.5		9.5		23	46	33.3	n	7.5		21	37	19.8	s
8.9		25	35	21.9		7.5		13	27	8.2	F	9.4			7	12.6		9.4		29	51	47.2		9.5		22	15	39.1	
9.5		26	44	45.1	n	9.5		14	29	34.4		7.0			40	30.8	G	9.5		30	8	3.0		9.5		27	7	20.2	
9.0		31	35	22.0		9.5			53	52.6		9.2		22	44	28.7		9.5		44	40	23.7		9.4		28	4	1.8	
9.4		32	33	23.3		9.5		15	4	2.9		8.8		23	51	43.5		9.5		45	39	53.0		9.5		29	35	16.8	
8.2		34	58	57.2	s	8.9		22	18	22.2		8.9		25	44	47.6		9.5		51	58	16.6		9.2		30	17	55.4	
9.5		45	36	21.9	n	8.4		23	56	29.8	F	9.5		35	43	17.2		9.2		55	34	11.1		9.5			25	47.8	
9.2		53	49	9.1		9.5		24	47	16.2		9.5		36	24	33.4		9.5		59	9	17.1		8.0		35	53	48.1	
9.5	7	0	6	17.7		9.4		37	54	39.4		9.5		37	1	21.6		9.4	18	6	14	56.1		9.3		36	43	27.0	
9.5		4	9	48.9		9.5			56	24.0		9.5		38	22	29.0		9.3			35	34.2		9.3		37	18	7.2	
9.2		9	14	26.6		8.6		40	40	7.7	s	9.5		40	23	15.2		9.5		7	25	18.7		9.4		47	55	20.0	

+85° & +86°

351—410

m	20u—23u	+85°	
	u ′ ″	′	
9.3	20 51 1	28.5	
9.3	55 9	29.4	
9.1	38	56.3	
8.0	56 27	7.3	F
9.1	58 43	17.8	
9.5	59 7	27.3	
8.8	21 4 45	0.6	
9.5	6 57	21.4	
8.1	12 36	17.5	s
9.5	13 37	5.7	n
9.0	28 25	3.1	
9.5	29 52	46.7	
9.5	33 19	54.0	
9.3	43 35	39.8	
9.5	51 35	14.1	
9.2	42	52.9	s
8.5	55 51	45.9	
9.5	56 14	13.8	
9.3	58 32	41.0	
9.0	59 19	18.2	
8.5	44	13.2	
9.5	22 0 48	57.1	
9.4	2 51	10.1	
9.4	3 0	57.7	
9.4	15	8.7	
8.5	5 38	10.1	
9.5	8 6	8.3	
9.4	12	24.8	
9.5	9 4	24.0	
9.5	13 55	15.3	
9.5	14 50	26.5	
9.4	16 33	25.1	
5.0	24 12	22.6	G
6.5	42	29.4	G
9.5	26 40	43.8	
9.0	27 41	50.0	
9.5	28 32	54.9	
9.5	40 14	30.7	
9.2	21	46.5	
8.7	45 39	54.0	
9.4	46 10	2.2	
9.2	50 52	50.4	
9.5	52 7	46.6	
9.4	23 8 39	7.4	
9.4	11 4	6.0	
9.5	13 20	59.9	
9.5	16 10	50.9	
8.5	19 3	15.7	s
7.5	24 11	37.2	F
8.0	25 48	12.6	F
8.0	27 13	45.5	F
9.3	47	31.4	
7.8	29 44	22.7	F
9.4	35 3	52.3	
9.5	36 23	7.0	
8.8	49 5	5.9	
9.5	13	58.3	
9.5	51 27	7.4	
8.0	52 50	54.0	G
9.4	54 2	51.7	

411—412

m	23u	+85°	
	u ′ ″	′	
9.3	23 56 20	33.9	
9.0	59 38	58.9	F

Zone +86°

1—50

m	0u—3u	+86°	
	u ′ ″	′	
9.4	0 6 11	41.1	
9.2	7 31	33.0	
9.5	16 4	34.3	
9.5	14	5.1	
9.5	17 26	10.7	
9.5	22 29	54.3	
8.8	36	59.8	R
9.5	27 59	4.5	
8.6	32 32	8.7	
9.5	37 31	34.3	
9.5	38 50	7.6	
9.5	39 26	3.4	
9.5	49	41.9	
8.8	43 12	31.8	
9.5	50 49	6.3	
9.5	51 42	17.9	
7.5	52 48	22.2	G
9.0	55 46	12.5	
9.5	58 3	34.7	
9.5	1 0 32	10.8	
8.8	4 4	10.2	s
9.5	5 58	53.6	n
9.5	15 36	9.4	
9.5	30 17	57.8	
8.8	31 38	12.7	G
9.4	32 51	1.1	
9.3	57	14.9	
9.5	43 46	28.7	
9.4	46 58	11.7	
9.3	47 1	4.1	
9.3	52 19	45.1	
9.3	53 20	41.0	
9.5	51	6.5	
9.5	54 19	0.8	
9.5	2 0 14	26.8	
9.5	9 7	8.5	
9.4	55	42.2	
9.0	13 42	20.8	
8.6	20 9	24.6	F
9.5	21 53	6.2	
9.2	24 25	34.5	
9.5	33 24	30.4	
8.9	35 20	56.8	
9.0	29	49.6	
9.3	40 0	37.6	
9.3	19	9.2	
9.5	46 39	54.1	
9.4	58 59	3.9	
9.5	3 9 56	49.8	
9.5	19 8	25.7	

51—110

m	3u—7u	+86°	
	u ′ ″	′	
6.0	3 19 29	10.7	G
9.3	21 49	15.6	
9.5	22 16	45.3	
8.9	36 19	31.7	s
9.0	39 31	5.3	
9.5	44 51	52.3	
9.5	45 33	46.5	
9.5	51 58	56.9	
9.4	4 3 16	52.8	
9.5	4 33	54.3	
9.5	10 53	8.7	R
9.5	15 38	3.0	R
9.5	16 27	23.1	
9.2	18 26	11.6	R
8.3	19 51	37.4	s
8.0	30 9	4.3	s
8.7	32 13	38.9	s
9.5	43	12.0	
9.4	39 8	24.8	R
9.5	58 8	14.7	
9.5	5 1 9	49.4	
9.3	2 35	17.4	
9.2	47	54.0	
9.5	7 43	5.3	
9.0	9 49	57.6	
9.5	11 15	51.0	
8.8	29 3	24.6	s
9.5	30 47	18.8	
7.0	48 0	45.6	G
9.5	49 42	48.0	
9.4	56 51	15.4	
9.5	58 21	48.9	
9.5	6 2 47	32.2	
9.5	4 42	57.6	
9.5	6 4	56.1	
8.9	10	4.4	s
9.5	7 40	52.1	
9.5	8 52	5.4	
9.6	10 24	12.8	
9.5	11 35	1.4	
9.0	16 28	29.7	
9.2	17 18	1.9	
9.5	23 17	16.2	
9.4	33	0.1	
9.5	25 30	13.6	
8.5	31 47	31.2	
9.5	37 56	55.8	
9.5	41 29	29.2	
9.5	47	30.9	
9.3	42 31	57.0	
9.5	46 56	50.5	
9.1	51 56	36.8	s
8.2	52 54	39.2	s
9.5	54 52	30.9	
9.5	7 6 2	50.9	
9.5	8 15	7.0	n
9.2	22 3	42.7	
9.5	27 3	43.3	
9.1	33	50.1	
8.7	28 43	46.4	s

111—170

m	7u—11u	+86°	
	u ′ ″	′	
9.5	7 30 38	51.2	
9.5	34 46	23.4	
7.2	37 9	6.0	s
9.5	31	30.7	
9.5	53 4	8.3	
9.3	24	41.4	
9.4	34	49.3	
9.5	57 57	9.3	
9.3	8 4 47	20.1	
8.5	52	16.6	s
9.5	11 41	2.2	
9.4	13 48	6.8	
9.5	22 55	10.5	
9.4	25 8	58.2	
9.5	29 48	34.8	
8.0	33 41	6.8	s
9.3	35 51	42.1	
9.5	36 47	29.1	
9.5	40 12	57.2	
9.0	42 12	9.6	
9.5	43 50	6.2	
9.0	45 13	28.8	
9.5	35	35.5	
9.1	58 55	29.3	
9.5	9 0 42	22.3	
9.5	3 37	3.6	
9.5	14 6	11.7	n
9.5	17 49	1.2	n
9.5	23 54	47.5	
9.5	30 42	5.8	
9.5	33 58	21.6	
9.5	43 50	38.5	
8.6	47 26	32.0	F
9.5	48 3	5.2	
9.5	57	24.1	
8.9	52 40	8.7	
9.5	43	42.5	
9.5	54 11	47.0	
8.8	10 0 34	15.0	s
9.5	5 33	47.5	
9.5	6 24	0.4	
8.4	8 31	47.7	S
9.5	24 23	32.1	
8.2	33 21	7.6	F
9.5	34 54	30.2	
9.2	35 27	30.4	
9.0	46 55	27.2	
9.5	48 5	12.5	
8.3	50 23	19.5	F
9.2	51 16	40.4	
7.2	56 10	25.5	F
9.5	11 6 4	46.5	
8.9	55	50.4	
9.5	8 19	41.5	
9.0	11 56	26.0	
9.5	17 10	24.6	
9.5	18 6	17.0	
9.5	19 48	25.1	
9.1	20 22	18.9	
7.0	23 45	25.0	F

171—230

m	11u—15u	+86°	
	u ′ ″	′	
8.6	11 34 49	9.4	
8.2	36 26	20.2	F
8.9	40 53	28.6	
9.5	50 33	32.3	
9.5	54 51	38.7	
5.7	57 22	23.5	G
8.5	12 5 1	30.7	s
9.0	19	9.3	
9.5	20	22.0	
8.4	19 18	6.7	
9.5	26 39	12.8	n
6.5	34 43	31.8	F
9.4	39 0	10.8	
8.8	45 31	14.4	s
9.5	47 23	31.5	n
9.5	54 31	48.5	
7.0	13 1 46	39.1	F
9.1	12 11	29.2	
9.5	16 2	24.8	n
9.0	21 11	10.1	
9.0	29 57	31.5	
9.0	33 2	4.0	
7.5	35 43	0.9	F
9.3	42 22	22.5	
9.2	45 31	48.2	
9.5	50 2	36.3	
9.5	53 36	21.2	
9.3	57 51	25.5	
8.5	59 36	14.1	
9.5	14 1 22	46.3	n
7.5	5 6	27.1	G
9.1	7 8	37.1	
9.5	8 54	6.9	
9.3	12 8	25.9	
9.5	19 42	55.5	n
9.5	20 40	56.4	n
9.5	24 5	15.2	
9.5	28 49	18.2	
9.5	29 8	9.9	n
9.5	32 39	12.0	n
8.5	36 57	14.8	
9.0	48 34	24.0	
9.5	55 19	11.7	
9.3	31	27.7	
8.6	57 1	45.9	
9.5	4	9.6	
6.8	58 29	32.7	S
9.5	46	26.4	
9.5	15 6 16	0.5	
9.5	8 2	54.7	n
8.1	14 35	3.7	F
8.8	18 45	27.2	
9.1	22 25	2.1	
9.4	28 32	4.4	
9.3	31 48	2.8	
9.5	32 9	23.1	n
9.3	27	26.4	
9.5	36 16	16.2	n
9.3	40 46	12.6	
9.1	45 6	59.6	

231—290

m	15ᵘ—19ᵘ	+86°	
	h m s	′ ″	
9.3	15 45 16	1.7	
9.3	54 57	50.3	
9.3	58 18	45.0	
9.3	16 7 34	25.5	
9.5	8 51	40.2	
9.5	13 44	3.6	
9.5	20 6	45.7	
9.5	21 22	12.2	
9.5	22 34	16.1	
9.0	24 10	24.0	
9.5	28 42	46.5	
9.0	31 20	9.3	s
9.5	38 1	26.0	
8.7	47 51	30.9	s
9.5	51 26	19.7	
9.1	58 28	36.9	
9.5	48	16.7	
9.5	59 50	38.2	n
9.5	17 6 43	2.3	
9.5	10 29	7.3	
9.5	11 31	48.2	
9.4	13 20	40.4	
9.5	14 58	12.3	
9.4	20 14	15.0	
9.5	24 40	9.9	
8.5	49	15.7	s
9.4	26 36	7.5	
9.5	35 33	39.7	
9.5	44 46	56.5	
9.4	45 28	44.1	
9.5	46 53	6.0	
9.4	48 15	1.6	
9.2	36	58.0	
8.5	49 8	58.3	F
9.5	53 57	15.3	
9.4	18 0 34	16.2	
9.5	1 55	23.1	
9.4	5 41	5.9	
4.5	19 7	36.0	
9.5	49	24.4	
9.5	20 4	11.5	
6.0	24 26	58.6	G
9.5	34	14.5	n
9.5	28 39	46.3	
8.2	40 9	29.8	F
9.5	41 21	57.8	n
8.8	52 50	5.5	s
9.5	56 48	26.3	
9.4	59 23	43.9	
9.5	32	31.2	
9.0	19 1 14	8.2	s
7.0	36	31.2	F
9.4	43	15.9	
9.5	2 25	44.6	
9.5	9 16	28.2	
8.8	10 12	11.1	s
9.5	21 3	38.1	
9.5	22 39	43.4	
9.0	28 58	24.6	
8.8	33 33	29.6	s

291—347

m	19ᵘ—23ᵘ	+86°	
	h m s	′ ″	
9.5	19 33 44	55.2	
9.5	47 21	42.7	
9.3	50 38	48.3	
9.5	51 3	25.5	
9.4	50	31.5	
9.3	52 22	4.0	
9.0	54 1	37.3	
9.3	58 28	8.7	
9.3	20 0 56	11.4	
9.4	3 40	46.0	
9.5	4 28	5.0	
9.5	5 26	16.5	
8.7	7 53	15.6	
9.5	11 51	15.2	
9.4	15 38	0.2	
9.5	21 0	0.4	
9.4	24 15	8.8	
9.5	26 56	20.3	
9.5	27 26	25.6	
9.5	40 39	57.0	
9.5	50 4	5.9	
9.4	51 52	5.6	
9.5	58 41	27.1	n
9.5	21 0 47	32.2	n
9.5	11 23	57.2	n
8.9	14 20	19.2	
9.0	22 50	8.0	
8.0	26 24	56.7	n
7.0	27 41	25.7	G
9.5	28 46	43.7	
9.4	29 15	24.7	
9.5	35 27	38.7	
9.5	50 25	7.2	
8.2	52 48	20.2	s
8.3	53 32	12.0	S
8.3	37	5.7	
9.3	55 34	3.8	
9.3	58 7	6.6	
9.5	22 6 37	11.6	
9.4	10 59	6.0	
9.4	26 56	28.3	
9.0	27 53	51.1	
9.4	42 25	41.8	n
9.4	43 26	52.3	
8.0	45 36	31.6	F
9.5	46 28	18.8	
9.5	51 25	1.4	
9.5	23 5 17	1.4	
9.5	9 7	49.1	
9.5	15 46	34.5	
9.5	23 52	13.9	
9.5	25 0	36.3	
9.5	45	26.7	
6.0	27 49	30.5	G
9.5	32 41	50.6	
9.3	40 56	33.1	
8.6	55 16	13.5	F

Zone +87°

1—50

m	0ᵘ—6ᵘ	+87°	
	h m s	′ ″	
9.0	0 4 31	35.7	
9.3	12 10	14.1	
9.5	27 49	21.7	
9.5	31 6	10.1	
9.2	33 25	1.8	R
9.4	36 24	5.5	
9.5	54	6.0	R
9.2	51 0	53.3	
8.8	32	29.4	G
9.5	39	19.6	
9.3	59 20	7.2	
8.0	1 7 6	48.2	s
9.1	12 11	8.8	
9.5	16 11	57.0	
8.2	35 34	46.7	F
8.8	40 2	59.0	s
9.5	53	29.1	
9.4	2 2 27	41.7	
9.5	12 8	48.8	
9.5	20 47	40.5	
9.5	22 51	30.3	n
9.3	28 22	37.6	
8.7	30 34	57.1	s
9.5	34 3	23.2	n
9.5	37 47	28.5	n
8.7	41 0	21.6	s
9.0	43 21	49.5	
9.5	58 14	21.3	
9.4	3 14 27	13.3	
9.5	21 42	50.0	n
9.2	34 29	7.2	
9.5	38 3	3.4	
8.5	43	53.7	s
9.4	56	18.7	
9.0	4 11 4	35.9	
9.5	22 11	43.5	
9.4	41 1	4.1	
9.3	45 39	20.8	
9.5	5 11 12	5.1	
9.5	17 32	12.6	
7.9	22 3	17.9	s
9.5	34 29	13.6	n
9.5	35 42	10.3	
9.5	49 40	58.9	n
8.9	6 0 4	23.7	
8.5	9 57	33.1	s
9.3	11 38	17.8	
9.3	12 31	59.8	
9.5	20 46	3.4	n
9.4	28 10	36.9	

51—110

m	6ᵘ—12ᵘ	+87°	
	h m s	′ ″	
5.0	6 3 7	15.1	G
9.5	44 11	25.9	
9.2	50 16	0.3	
9.3	52 2	11.5	
9.5	55 29	5.6	
9.0	7 9 50	37.0	
9.5	10 40	35.0	n
9.3	54	48.3	
9.5	11 19	12.0	n
9.4	22 2	3.4	
9.5	32 20	34.5	n
9.5	33 12	2.9	n
9.4	49 38	4.0	
9.5	51 3	35.5	n
9.4	8 0 36	11.7	
9.3	2 25	11.9	
9.1	52	54.3	
8.8	6 10	23.2	s
9.1	8 25	9.9	s
9.5	9 3	17.2	
9.2	12 49	21.6	s
9.3	25 45	19.4	
9.0	27 30	54.7	
9.3	28 17	25.2	
9.3	43 13	16.7	
9.5	46 24	7.2	n
9.5	55 0	11.2	
8.0	9 0 48	29.1	F
8.5	9 45	45.5	F
8.5	14 29	5.6	s
9.2	19 49	56.5	
8.9	22 59	49.1	s
7.7	29 53	15.6	F
9.5	35 7	51.6	n
8.5	47 45	59.4	F
9.2	58 12	31.9	
9.5	10 0 26	8.6	
9.5	3 10	6.7	
9.3	7 59	5.3	
9.4	11 37	4.1	
9.5	16 32	23.4	
9.4	46 39	33.7	
9.5	50	26.3	
9.5	51 47	24.3	
9.5	52 37	19.5	
9.5	11 9 27	2.4	
9.5	13 13	37.2	
9.5	31 40	19.5	
8.8	44 13	1.6	s
9.0	51 15	48.2	
8.0	36	48.1	S
9.0	53 52	10.5	
9.3	58 2	4.2	
8.2	12 6 38	44.3	F
9.3	7 17	0.7	
9.5	10 56	33.6	
6.5	12 33	14.5	G
9.2	15 37	21.0	
9.5	24 48	54.0	
9.3	52	49.3	

111—170

m	12ᵘ—18ᵘ	+87°	
	h m s	′ ″	
9.5	12 26 52	34.1	
9.1	42 45	45.0	
8.9	43 35	16.8	
9.5	46 10	49.7	n
8.4	13 1 23	26.5	s
9.5	4 38	36.5	
9.1	8 55	0.8	
8.6	19 46	52.6	B
9.5	21 18	10.4	n
9.5	22 10	10.8	
8.9	24 36	4.6	s
8.8	30 29	18.9	s
9.5	36 24	23.9	n
9.0	40 47	14.9	
9.0	45 40	3.6	
9.3	49 20	4.7	
9.0	56 44	53.1	
9.4	58 7	0.2	
8.5	27	12.7	s
8.7	14 2 43	18.8	
9.4	4 0	42.1	
9.5	8 45	32.7	
8.8	15 36	11.0	
9.5	24 48	55.7	
9.5	25 39	33.2	
9.5	29 31	19.6	
9.5	30 27	44.9	
9.3	38 39	55.7	
9.5	44 16	21.0	
9.5	47 9	3.5	
9.3	59 29	54.9	
9.5	15 8 38	46.4	
7.0	26 0	46.8	G
9.4	30 18	35.5	
9.5	34 15	45.3	
9.4	36 33	36.3	
7.9	43 11	31.6	s
9.1	57 15	56.1	s
9.2	54	3.6	n
9.5	16 25 40	0.7	
8.9	26 40	51.2	s
9.2	29 30	42.5	
9.5	49 16	44.8	
9.5	52 47	50.4	
9.3	54 9	10.6	
9.5	54	55.3	
9.5	17 6 53	35.7	
9.1	7 1	29.7	
9.5	14 20	2.5	
9.1	18 0	45.0	
9.1	21 55	34.1	
9.5	27 3	29.5	n
9.4	59 17	46.2	
9.2	18 3 45	4.0	
9.5	9 28	11.3	
8.9	10 50	49.1	s
9.5	13 7	23.8	n
9.3	18 14	57.4	
8.1	24 11	24.2	F
9.4	26 13	30.6	

171—220

m	18ᵘ—23ᵘ	+87°	
	ᵘ ′ ″	′	
9.5	18 27 8	1.8	
9.4	32 46	58.4	
9.0	42 30	57.9	s
9.1	48 27	17.1	
9.5	58 52	36.9	
9.5	19 16 39	37.4	
9.3	20 31	34.7	
9.5	27 50	31.8	
9.5	29 21	10.8	
8.0	30 49	4.3	s
8.0	36 5	35.7	s
9.5	20 1 39	51.6	
9.0	8 49	59.7	
9.5	11 56	54.1	
8.9	14 8	45.6	
9.0	15 13	33.7	
8.0	41 17	28.9	s
9.5	58 7	31.8	n
9.5	34	39.4	n
9.2	21 2 48	27.9	
9.4	11 58	56.0	
9.3	19 38	41.2	
9.2	21 28	42.3	
9.1	25 19	29.5	
9.3	33 19	17.5	
9.2	54 16	5.9	
9.5	56 19	16.3	n
9.4	57 57	16.2	
8.8	22 0 52	45.1	
9.4	3 40	3.6	n
8.2	6 57	5.8	s
9.5	20 6	42.8	
9.5	29 5	12.4	
9.5	52	57.3	
7.5	30 46	20.6	F
9.2	40 42	2.9	
9.5	53 14	21.5	
9.5	54 55	47.4	
9.5	56 32	51.4	
9.5	23 3 35	44.9	
9.4	49	51.9	
9.4	6 12	10.0	
9.5	10 36	21.4	
9.4	18 24	47.0	
9.5	21 4	50.9	
9.5	52	5.0	n
8.5	42 24	32.2	s
9.5	46 14	17.8	n
9.5	54 59	46.2	n
8.8	58 7	4.9	

Zone +88°

1—40

m	0ᵘ—6ᵘ	+88°	
	ᵘ ′ ″	′	
9.5	0 4 23	51.3	
8.8	11 2	38.5	s
9.5	28 17	31.2	
7.5	45 31	14.6	G
9.2	49 5	12.8	
9.5	1 3 50	19.9	
9.5	6 5	31.9	
2.0	31	32.2	
8.0	51 8	29.2	F
9.0	57 37	53.5	s
8.8	58 53	2.7	s
9.0	2 13 10	12.1	J
8.5	17 7	22.2	s
9.4	23 30	12.0	
9.4	36 18	42.0	
9.2	42 27	16.3	
9.5	49 31	9.5	
9.5	3 23 4	14.7	
9.4	33 21	29.8	
9.2	37 11	54.1	
9.5	41 54	0.6	n
9.5	55 57	48.5	
9.5	4 12 13	2.7	n
9.5	15 25	3.1	
9.5	29 23	0.0	
9.4	31 33	29.5	
9.4	35 4	7.2	
9.5	59 2	2.8	
8.8	5 0 43	41.6	
9.5	3 23	19.3	
8.8	11 59	23.6	
9.5	19 17	55.7	
9.3	25 58	35.0	
9.4	40 14	37.4	
9.0	56	19.8	
9.5	50 2	51.2	
9.5	6 14 44	7.5	
9.5	34 37	50.1	n
8.5	47 0	0.6	
9.4	58 2	12.0	

41—90

m	7ᵘ—15ᵘ	+88°	
	ᵘ ′ ″	′	
9.3	7 8 22	45.4	
9.5	23 11	50.6	
9.2	24 22	47.7	
9.4	32 42	0.0	
9.5	43 10	14.7	
9.4	44 45	20.6	
9.3	48 51	47.0	
9.4	57 38	1.7	
9.5	8 15 35	15.5	
9.5	21 15	21.2	
9.5	25 55	27.5	n
9.5	30 14	46.8	B
9.5	33 4	1.6	
9.3	44 36	55.4	
9.1	9 2 17	24.3	
9.5	4 49	19.1	
9.4	9 13	36.4	
9.4	27 15	43.8	
9.5	45 50	46.8	
8.5	59 33	36.0	F
9.5	10 10 39	2.2	
9.5	16 36	56.3	
9.3	36 5	48.6	
7.5	52 57	25.5	F
9.3	11 8 52	40.6	
9.5	13 48	9.0	
9.4	21 4	29.3	
9.5	31 27	35.2	
9.4	35 21	58.2	
9.5	45 34	38.7	
6.5	12 14 22	30.2	G
9.3	15 31	35.1	
9.5	21 56	39.8	
9.3	40 34	6.0	
9.0	52 50	45.9	s
8.0	13 12 10	25.6	G
8.5	36 44	17.6	G
9.2	43 30	50.8	
9.5	39	48.7	
8.6	14 4 56	0.7	s
9.5	15 1	22.9	n
9.5	18 8	36.4	
9.4	22 50	27.2	
9.5	29 1	36.4	
9.1	21	32.7	
8.5	32 35	4.3	s
9.5	39 48	36.3	
9.5	52 33	47.7	
9.5	15 17 22	19.4	
8.9	31 11	33.5	

91—140

m	15ᵘ—23ᵘ	+88°	
	ᵘ ′ ″	′	
9.4	15 38 38	18.1	
9.2	16 11 27	1.7	s
9.5	18 11	8.7	
9.0	36 36	27.5	
9.5	39 33	27.5	n
9.3	55 8	31.9	
9.6	58 2	15.8	
9.5	17 1 16	8.5	
9.4	14 35	20.3	
8.8	35 13	13.0	s
9.0	18 13 9	41.3	
9.0	20 17	34.7	
9.5	21 49	4.2	
8.0	24 17	14.4	F
8.5	34 24	43.3	s
9.5	51 15	51.8	
9.5	58 10	55.9	
9.3	19 5 16	32.7	
9.0	24 14	3.3	
8.8	25 37	33.9	s
8.8	37 15	4.1	S
6.5	20 8 30	52.5	G
9.5	16 59	36.7	n
8.0	17 10	33.5	
8.8	24 15	26.3	s
9.5	28 46	46.1	
var	34 37	41.0	G
9.0	53 59	4.7	
9.3	58 6	20.8	
9.5	21 7 44	16.8	n
9.4	14 15	20.0	
9.0	53	22.1	
9.3	22 18	8.2	
9.2	28 10	13.1	
9.5	32 48	32.4	
9.5	35 42	57.4	n
9.5	47	24.0	
9.5	41 33	4.5	
9.4	22 0 40	41.8	
8.6	10 46	9.7	
8.7	30 38	44.0	
9.5	37 59	15.6	
9.2	43 14	29.9	
9.1	23 3 45	35.0	
9.5	5 19	52.0	
9.5	35 58	26.7	
9.4	36 28	23.3	
9.5	40 29	23.8	
9.0	44 6	2.4	
9.5	46 13	10.5	n

141—143

m	23ᵘ	+88°	
	ᵘ ′ ″	′	
9.5	23 48 53	44.2	
9.4	51 58	38.3	
9.4	56 56	18.7	n

Zone +89°

1—38

m	0ᵘ—23ᵘ	+89°	
	ᵘ ′ ″	′	
9.5	0 11 5	36.2	
9.2	1 17 35	0.2	s
8.8	49 36	29.2	
9.4	50 57	23.6	
9.5	51 58	13.3	
9.4	2 16 43	0.6	
9.3	3 11 12	4.3	
9.5	53 49	0.5	
9.1	4 49 39	27.1	
9.5	5 43 44	6.0	
9.5	57 3	3.6	
9.1	6 17 38	37.9	
7.0	7 3 40	1.8	G
9.5	14 2	1.0	
9.2	27 50	1.6	
9.5	8 58 47	39.4	
9.0	10 26 21	32.0	s
8.9	11 8 27	43.9	s
9.5	9 11	32.9	n
9.5	12 0 23	26.3	n
8.8	59 20	28.3	s
8.7	13 3 53	8.7	s
9.4	25 6	32.6	
9.5	15 3 47	24.2	n
9.0	14 45	40.9	s
9.5	44 3	55.1	
9.5	45 16	2.8	
8.7	17 21 38	18.4	
9.4	18 7 27	43.8	
9.3	42 30	9.5	
9.5	19 29 17	38.0	
9.5	37 46	12.9	
9.5	45 0	27.5	
9.3	56 5	14.3	
9.3	20 13 29	45.9	
9.5	21 8 21	31.7	
9.3	22 6 40	48.0	
9.0	23 21 18	0.8	

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